A Critique of the August 9th Weldon Spring Site Stewardship Plan:
"Long Term Surveillance and Maintenance Program
Long-Term Stewardship Plan for the Weldon Spring, Missouri, Site"
August 9, 2002
(GJO-2002-342-TAC; GJO-LWEL 1.1-1)

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Analysis 8/20-22/2002

This critique was written from a copy downloaded from the web. The URL was supplied in an announcement of document availability letter DWM received August 10, 2002. A written copy was requested by letter 8/16/02. Not received as of 8/20/02.

This comments narrative was based on the web version.

A-1 On 8/06/02, 8/16/02 and 8/23/02 Dan McKeel requested in writing and via e-mail to be mailed copies of the Aug. 9, 2002 LTSM draft plan. A copy was finally received on Monday, August 26, 2002 just two days prior to the 8/28 public workshop. **The bound copy contained many different, larger and more eligible maps and figures than were available on the web version**. I must register a strong complaint that the public wasn't provided a hard copy on the release date of August 9th, 2002.

Response A-1: DOE notes the commentor's complaint and acknowledges the inconvenience caused by the short time the commentor had to review the hard copy version of the LTS Plan before the August 28, 2002, workshop.

Part I of the critique, pages 1-56 follows...
filename: steward2b_critique8.9.02.doc

General comments:

A-2 1. The pages should be numbered consecutively in a prominent uniform position (bottom center, top right, etc.)

Response A:2: Other reviewers have found the document easier to use when chapter numbers are incorporated in the page number and DOE elects to retain the numbering format presented in the August 9, 2002 draft LTS Plan. However, DOE will move page numbers down onto the line beneath the document number to improve readability.

A-3 2. There is no mention of permanent cell video or motion or sound monitoring equipment being installed now or planned for the future. This would seem to be a basic safeguard.

Response A-3: DOE will evaluate the value of adding a surveillance camera to the existing Interpretive Center surveillance system.

A-4 3. No mention is made of ICs in the form of restricted fly-over agreements with commercial carriers of the military services. These controls should be in place.

Response A-4: DOE intends to not implement the suggested restrictions but will consult with experts and will discuss this topic at a fall, 2002, working session.

A-5 4. The contents of APPENDIX A and B are empty. These documents need to be added before the plan goes into effect September 30, 2002.

Response A-5: DOE will insert the legal descriptions in Appendix A and all executed and recorded ICs in Appendix B when the LTS Plan is next revised. Draft restrictive language will be presented for all institutional controls in the next revision of the plan. The plan will clearly indicate which institutional controls remain to be implemented. DOE does not expect to have all institutional controls implemented when the plan is next revised in early 2003.

A-6 5. The report is generally too skimpy on specific details. This is a legal plan, a roadmap, a protocol that should provide specific actions and protocols that will be followed. Such protocols need to be very specific what are the specific agency and agency subdivision responsibilities at the site.

Response A-6: DOE will review the LTS Plan with the commentor's input in mind. Our intention is to leave a clear and comprehensive plan that would allow a person unfamiliar with the site to evaluate and respond to site conditions. DOE is committed to describe stakeholder and regulator roles and responsibilities, which will serve to describe relationships between parties.

A-7 6. The actual full extent (inventories, including volumes and masses) of all major and minor known radioactive and non-radioactive materials on site and at vicinity properties before and after remediation need to be defined. This includes plutonium and other transuranics DOE states were shipped to the Weldon Spring site as 74,000 metric tons of recycled uranium. This inventory should be thorough and comprehensive—reference to site contaminants is too approximate and vague. The cell inventory should be a separate inventory.

Response A-7: The WSSRAP has extensive characterization data of the site contaminants of concern. The WSSRAP also has work package and other information, which identifies volumes of waste handled in various areas on-site. The vicinity property closure reports describe in detail the volumes of wastes excavated from those areas. The Site Treatment Plan document and annual reports detail the mixed waste information for

the site and the PCB annual reports provide detailed information regarding polychlorinated biphenyls (PCBs). The annual environmental reports include detailed information also. This information is and has always been fully available and subject to review. The remediation has been an ongoing process over the last 15 years and the DOE has been fully communicating this information with the public and the regulators through the CERCLA process. The past characterization information including all contaminants, masses, volumes, etc. has not been compiled in detail and included in the stewardship plan, as DOE feels that that is not the purpose of the stewardship plan and would provide little or no benefit. As stated before, this information has been available as it was produced. A list of these documents is provided for your reference:

1. MK-Ferguson Company and Jacobs Engineering Group. *Remedial Investigation for the Chemical Plant Area of the Weldon Spring Site*. Rev. 0. 2 Vols. DOE/OR/21548-074. Prepared for the U.S. Department of Energy, Oak Ridge Field Office, Weldon Spring Site Remedial Action Project. St. Charles, MO. November 1992.

2. MK-Ferguson Company and Jacobs Engineering Group. *Remedial Investigations for Quarry Bulk Wastes.* Rev 1. DOE/OR/21548-066. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project. December 1989.

3. U.S. Department of Energy. *Interim Record of Decision for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site*. DOE/OR/21548-798. Prepared by Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project. Weldon Spring, MO. September 2000.

4. MK-Ferguson Company and Jacobs Engineering Group. *U.S. Department of Energy Five-Year Review (Type 1a)*. Rev. 0. DOE/OR/21548-632. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. June 1996.

5. Argonne National Laboratory. *Record of Decision for the Management of the Bulk Wastes at the Weldon Spring Quarry*. Rev. 0. DOE/OR/21548-317. St. Charles, MO. September 1990.

6. MK-Ferguson Company and Jacobs Engineering Group. *Quarry Bulk Waste Excavation Remedial Action Report*. Rev. 3. DOE/OR/21548-642. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. March 1997.

7. U.S. Department of Energy. *Record of Decision for Remedial Action at the Chemical Plant Area of the Weldon Spring Site*. Rev. 0. DOE/OR/21548-376. Oak Ridge Field Office. St. Charles, MO. September 1993.

8. Boerner, A.J. *Radiological Survey of the August A. Busch and Weldon Spring Wildlife Areas Weldon Spring Site, St. Charles County, Missouri*, Final Report. Prepared by Oak Ridge Associated Universities, for U.S. Department of Energy, Division of Remedial Action Projects. April 1986.

9. MacDonell, M.M., J.M. Peterson, and I.E. Joya. *Engineering Evaluation/Cost Analysis for the Proposed Management of Contaminated Water in the Weldon Spring Quarry*. DOE/OR/21548-039. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office, Weldon Spring Site Remedial Action Project. January 1989.

10. Argonne National Laboratory. *Engineering Evaluation/Cost Analysis for the Proposed Removal Action at the Southeast Drainage near the Weldon Spring Site, Weldon Spring, Missouri*. DOE/OR/21548-584. Prepared for the U.S. Department of Energy, Weldon Spring Site Remedial Action Project. Weldon Spring, MO. August 1996.

11. MK-Ferguson Company and Jacobs Engineering Group. *Closeout Report for Vicinity Properties DA-1, DA-2, DA-3, DA-5, and DA-7*. Rev. 0. DOE/OR/21548-778. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. May 1999.

12. MK-Ferguson Company and Jacobs Engineering Group. *Analytical Data Results for Engineering Characterization of Vicinity Property DA-6: Ash Pond Drainage.* Rev. 2. DOE/OR/21548-824. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. January 2001.

13. MK-Ferguson Company and Jacobs Engineering Group. *Close-out Report for Vicinity Properties MDC-3, MDC-4, MDC-5, and MDC-10.* Rev. 1. DOE/OR/21548-789. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. June 1999.

14. MK-Ferguson Company and Jacobs Engineering Group. *Close-out Report for Vicinity Properties MDC-6 and MDC-9*. Rev. 0. DOE/OR/21548-775. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. April 1999.

15. MK-Ferguson Company and Jacobs Engineering Group. *Vicinity Property DOC-8 Close-out Report*. Rev. 0. DOE/OR/21548-679. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. April 1997.

16. MK-Ferguson Company and Jacobs Engineering Group. *Southeast Drainage Close-out Report Vicinity Properties DA-4 and MDC-7*. Rev. 0. DOE/OR/21548-772. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. September 1999.

17. MK-Ferguson Company and Jacobs Engineering Group. *Analytical Data Results for Frog Pond Characterization Sampling Plan.* Rev. 0. DOE/OR/21548-841. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. November 2000.

18. MK-Ferguson Company and Jacobs Engineering Group. *Closure Report for Soil Sampling at Frog Pond Drainage Outlet and MDC-6; Addendum 4 of the Engineering Soil Sampling Plan for Army and MDOC Vicinity Properties*. Rev. 0. DOE/OR/21548-791. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. June 1999.

19. MK-Ferguson Company and Jacobs Engineering Group. *Completion Report for Sediment Sampling at Busch Lakes 34 and 35*. Rev. 0. DOE/OR/21548-768. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. February 1999.

20. MK-Ferguson Company and Jacobs Engineering Group. *Busch Lake 36 Summary Closeout Report*. Rev. 1. DOE/OR/21548-702. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. October 1997.

21. U.S. Department of Energy. *Feasibility Study for Remedial Action at the Chemical Plant Area of the Weldon Spring Site*, 2 Vols. DOE/OR/21548-148. Oak Ridge Field Office, Weldon Spring Site Remedial Action Project. St. Charles, MO. November 1992.

22. Argonne National Laboratory. *Record of Decision for Remedial Action for the Quarry Residuals Operable Unit at the Weldon Spring Site, Weldon Spring, Missouri.* DOE/OR/21548-725. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. September 1998.

23. Argonne National Laboratory. *Baseline Risk Assessment for the Quarry Residuals Operable Unit of the Weldon Spring Site, Weldon Spring, Missouri.* DOE/OR/21548-594. Prepared by the Environmental Assessment Division for the U.S. Department of Energy, Weldon Spring Site Remedial Action Project. Weldon Spring, Missouri. July 1997.

24. Argonne National Laboratory. *Feasibility Study for Remedial Action for the Quarry Residuals Operable Unit at the Weldon Spring Site, Weldon Spring, Missouri*. DOE/OR/21548-595. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office by the Environmental Assessment Division. St. Charles, MO. March 1998.

25. Argonne National Laboratory. *Proposed Plan for Remedial Action at the Quarry Residuals Operable Unit of the Weldon Spring Site.* DOE/OR/21548-724. Prepared

for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. March 1998.

26. Argonne National Laboratory. *Remedial Investigation for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri*. DOE/OR/21548-571. Prepared for U.S. Department of Energy, Weldon Spring Site Remedial Action Project. Weldon Spring, Missouri. July 1997.

27. Argonne National Laboratory. *Baseline Risk Assessment for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri*. DOE/OR/21548-568. Prepared by the Environmental Assessment Division for the U.S. Department of Energy and the U.S. Department of the Army. July 1997.

28. MK-Ferguson Company and Jacobs Engineering Group. *Feasibility Study for Remedial Action for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri*. DOE/OR/21548-569. Prepared for the U.S. Department of Energy, Weldon Spring Remedial Action Project and U.S. Department of the Army, Corps of Engineers. March 1998.

29. Argonne National Laboratory. *Supplemental Feasibility Study for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site, Weldon Spring, Missouri.* DOE/OR/21548-783. Prepared by the Environmental Assessment Division for the U.S. Department of Energy. June 1999.

30. Argonne National Laboratory, Environmental Assessment Division. *Proposed Plan for Remedial Action for the Groundwater Operable Unit at the Chemical Plant Area of the Weldon Spring Site.* DOE/OR/21548-733. Prepared for the U.S. Department of Energy, Weldon Spring Site Remedial Action Project. Weldon Spring, Missouri. June 1999.

31. MK-Ferguson Company and Jacobs Engineering Group. *Feasibility Study for Management of the Bulk Wastes at the Weldon Spring Quarry, Weldon Spring, Missouri.* DOE/OR/21548-104. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. February 1990.

32. MK-Ferguson Company and Jacobs Engineering Group. *Waste Assessment Radiological Characterization of the Weldon Spring Site Raffinate Pits*. Rev. 0. DOE/OR/21548-062. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. August 1989.

33. MK-Ferguson Company and Jacobs Engineering Group. *Remedial Investigation for the Quarry Residuals Operable Unit of the Weldon Spring Site, Weldon Spring,*

Missouri. Rev. 2, Final. DOE/OR/21548-587. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. February 1998.

34. Haroun, L.A., J. M. Peterson, M.M. MacDonell, and I. Hlohowskyj. *Baseline Risk Evaluation for Exposure to Bulk Wastes at the Weldon Spring Quarry, Weldon Spring, Missouri*. DOE/OR/21548-065. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. January 1990.

35. MK-Ferguson Company and Jacobs Engineering Group. *Site Treatment Plan for the Weldon Spring Site.* Volume I: *Compliance Plan,* Volume II: *Background Volume, and* Appendix A: *Alternatives Evaluations*. Rev. 0. DOE/OR/21548-473. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. November 1995.

36. MK-Ferguson Company and Jacobs Engineering Group. *Closure Report for Soil Sampling at the Frog Pond Outlet, Addendum 6 of the Engineering Soil Sampling Plan for Army and MDC Vicinity Properties.* Rev. 0. DOE/OR/21548-829. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. January 2000.

37. MK-Ferguson Company and Jacobs Engineering Group. *Closure Report for the Radiological Characterization of Sediments and Soil within the Southeast Corner of Busch Lake 36 Sampling Plan.* Rev. 0. DOE/OR/21548-835. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. March 2000.

38. MK-Ferguson Company and Jacobs Engineering Group. *Close-out Report for the Frog Pond Drainage*. Rev. 0. DOE/OR/21548-840. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. October 2000.

39. MK-Ferguson Company and Jacobs Engineering Group. *Baseline Assessment for the Chemical Plant Area of the Weldon Spring Site.* DOE/OR/21548-091. Prepared for the U.S. Department of Energy, Oak Ridge Operations Office. St. Charles, MO. November 1992.

40. Site Treatment Plan Annual Updates.

41. Annual Site Environmental Reports.

A list of the wastes and associated quantities that were placed in the cell will be included in the next revision of the stewardship plan. The contaminant levels that have been left in place post remediation will be provided in summary form in the Stewardship plan. The purpose of this table will be to demonstrate that clean up goals have been met.

It is not known precisely how much if any recycled uranium was sent to Weldon Spring. Following statements are taken from The *DOE Ohio Field Office Recycled Uranium Report* May 15, 2000. Page F-28 states "Since the use of recycled uranium at the Weldon Spring site has not been definitely ascertained, the values may overstate site involvement with recycled uranium". Also from page C-19: "… it cannot be definitively determined whether or not these sites in (the) St. Louis area received recycled uranium during their operational lifetime". However this report conservatively assumed that all uranium processed at Weldon Spring from 1962 on could have been recycled uranium. Given this, the report authors concluded that a maximum of 0.0 g Pu-239, 15.3 g Np-237, and 6.1 g Tc-99 could have remained at Weldon Spring (from Table ES-7D, page ES-25). However when samples were collected from the raffinate pits (the most likely place for these contaminants to be), all sample results indicated no detectable transuranic isotopes at the established detection limit. Further detail is provided in the fact sheet entitled "Recycled Uranium, Transuranics and Their Relationship to Weldon Spring Site Remedial Action Project", which is also available on the WSSRAP website:

Recycled Uranium, Transuranics and Their Relationship to Weldon Spring Site Remedial Action Project

A Fact Sheet

INTRODUCTION

On August 8, 1999, Energy Secretary Bill Richardson announced a comprehensive set of actions to address issues raised at the Paducah Gaseous Diffusion Plant that may have had the potential to affect the health of the workers. One of the issues addressed the need to determine the extent and significance of radioactive fission products and transuranic elements in the uranium feed and waste products throughout the DOE national complex. Subsequently, a DOE agency-wide Recycled Uranium Mass Balance Project (RUMBP) was initiated. For the Weldon Spring Uranium Feed Materials Plant (WSUFMP or later referred to as Weldon Spring), receipts and shipments of "recycled " uranium are best estimated by analyzing other DOE site historical records.

This broad assessment of the flow of recycled uranium within the DOE complex determined that Weldon Spring received relatively small quantities of uranium materials that may have contained the constituents of recycled uranium. Subsequently, the RUMBP identified the Weldon Spring Site as a "minor" receiver/processor of recycled uranium. A discussion of the constituents of recycled uranium is in the historical perspective section of this fact sheet.

In 1999, the Weldon Spring Site Remedial Action Project (WSSRAP) responded to the DOE's concern over transuranics in the recycled uranium by reviewing existing databases and conducting focused analyses on available waste and environmental media. The results of this 1999 effort indicated no detectable presence of transuranics at the Weldon Spring Site. Additionally, even if present in the small estimated concentrations as reported, the worker protection and clean up criteria established would not have been

changed. The following fact sheet provides a summary of the information leading to that conclusion.

HISTORICAL PERSPECTIVE

In January of 1952, the Atomic Energy Commission (predecessor to the Department of Energy) began recovering uranium from spent reactor fuel in order to supplement the limited supply of natural uranium. The chemical reprocessing of spent nuclear fuel for uranium was very efficient, however, trace quantities of impurities accompanied the uranium product. These impurities included transuranic elements such as plutonium, neptunium and americium and long-lived uranium fission products such as technetium. Limits were placed on the allowable residual plutonium content because of its relative value and significance as a nuclear material. Uranium materials were processed to recover all but 10 parts per billion (ppb) of plutonium prior to release. Similar levels of recovery or removal of other transuranics were also carried out. This made plutonium and the other transuranic elements only trace quantities in the materials shipped to Weldon Spring.

A 1986 report entitled "Historical Nuclear Materials Balance Report for the Former AEC-Owned Weldon Spring Chemical Plant" was prepared by the DOE. It summarized nuclear materials received and processed through Weldon Spring. The report indicates that Weldon Spring intermittently received, processed and shipped out relatively small quantities of depleted and slightly enriched uranium material during its operational period of 1957 to 1966. The 1986 materials balance report does not provide information as to the origin of depleted/enriched uranium receipts or the nature of the uranium (recycled vs. natural.)

The RUMBP report was a summary of nine area reports. The Ohio Report portion of the RUMBP included reviews of 4 sites, including Fernald, Weldon Spring, West Valley and RMI. According to the RUMBP's Ohio Report, records from other sites indicate that Mallinckrodt Chemical Works (MCW), the operator of the WSUFMP and other plants in the St. Louis area, began receiving materials containing recycled uranium in 1962. It is known that the depleted/enriched uranium material at least partly originated from reprocessed, or recycled, uranium material. Because it is possible that MCW's natural uranium ore was augmented by recycled uranium material, the DOE report conservatively considered all uranium processed at Weldon Spring after 1962 as "recycled". The DOE reports used these assumptions and the resulting uranium quantities to calculate their "worst-case" quantities of transuranic elements. The quantities of radionuclides of concern recently reported in the news media (2.4 grams Plutonium, 330 grams Neptunium, and 7200 grams Technicium-99) were excerpted from the Ohio report and represent these worst-case assumptions. As stated in the report, these quantities represent amounts that could have been processed along with the uranium material. It does not represent what was actually processed or, more importantly, what remained at the site. In fact, that report estimates these quantities to be significantly less (0.0 grams Plutonium 239, 12.3-15.3 grams Neptunium 237, and 4.9-6.1 grams Technicium 99). These estimates also evolve from the report's conservative assumption of 100 percent recycled uranium after 1962.

In the Ohio report, it is assumed that all materials shipped to MCW were shipped to the MCW-Weldon Spring facility. Based on the fact that MCW operated two other facilities, it is not clear that all materials attributed to delivery at the Weldon Spring Plant were in fact shipped to this MCW address. At this point, material shipment records at the Fernald Environmental Management Project (FEMP) correlate approximately with enriched uranium receipt records within the 1986 materials balance report.

WSSRAP DATA REVIEW

The WSSRAP reviewed existing site historical documents for evidence of previous characterization of transuranic or fission product elements. The following are the findings of this review:

- Monitoring data representing environmental conditions in the worker breathing zones, general work areas, and at site perimeters show that levels of airborne alpha emitting nuclides have been maintained at safe levels throughout the project.
- In the Fall of 1999, breathing zone (BZ) and general area (GA) air samples from the Disposal Cell Construction activities were analyzed for plutonium, neptunium, and americium and technetium isotopes. The results showed no indication of these transuranic constituents.
- The spectral data of all past fecal bioassays were reviewed for the presence of Plutonium 239 and none was detected. The current bioassay laboratory routinely checks each spectrometer report for evidence of plutonium contamination. Any occurrence of plutonium in the samples would result in the immediate notification of the WSSRAP ES&H Department.
- In Fall of 1999, disposal cell leachate water was analyzed for plutonium, neptunium and americium isotopes. No transuranic elements were detected in the primary barrier leach water (i.e., above the detection limit with sample error considered). One of the secondary barrier leach water samples exhibited a net quantity of Neptunium-237 above the detection limit and associated error. However, this detect is considered a low-level false positive for the following reasons:
  a) No Np-237 was detected in the primary leach water samples.
  b) The level detected was less than three-times the detection limit and the vendor laboratory did not recommend declaring it a positive result.

ADDITIONAL SAMPLING CONDUCTED

In 1999, it was determined that some limited waste materials remained accessible for sampling, although the majority of the wastes had been placed and covered in the disposal cell. A sampling plan was prepared and executed to analyze these remaining waste materials for the constituents of concern. Samples collected included:

- contaminated sludge from Raffinate Pits 1, 3, and 4
- contaminated soil from the Ash Pond Storage Area and Frog Pond Outlet

The laboratory's minimum detection activity level (MDA) was intentionally established at a low level (less than 0.5% of each sample's estimated total radioactivity e.g., approximately 0.64 pCi/g for Pu-239). All sample results indicated no detectable transuranic isotopes at the established detection limit.

RADIATION SAFETY AND HEALTH EFFECTS

Uranium is known to be a radiological health hazard. As such, the industrial handling of uranium and uranium compounds is controlled to protect workers, the public and the environment. The greatest health hazard from uranium at the WSSRAP is associated with breathing it into the lungs. To control occupational inhalation exposures to acceptable levels, regulatory agencies have established limits on the allowable concentrations of radioactive materials in air. The limits/levels established at the WSSRAP for exposure to uranium and thorium are adequate to protect for the transuranic and fission products of concern.

1999 NOTIFICATION OF STAKEHOLDERS

When DOE Headquarters concern over transuranic and fission products contamination first became known to the WSSRAP in the late summer of 1999, we informed the various stakeholders of the project, including workers, citizen's commission and regulators. In writing and in briefings, we told them what we knew about the issues and what our immediate plans were to investigate the possible consequences to the WSSRAP and the surrounding community. Following completion of the specific actions taken in 1999 described above to investigate the presence of transuranic and fission products at the WSSRAP, we again met with workers and informed the citizen's commission and regulatory stakeholders of our findings of no detectable presence at the site. We addressed specific questions and concerns by regulators and the public, recognizing that the DOE Headquarters office was pursuing the larger question of nation-wide distribution of recycled uranium.

WHERE WE ARE TODAY

The DOE recognizes the publics' concern over the recently reported information about recycled uranium relative to the WSSRAP. The DOE is confident that the possible association of recycled uranium with the former operations at Weldon Spring does not constitute a new or unknown hazard for the workers, the community or the environment. The DOE has been working in concert with local, state and federal regulators and the public since 1986 to ensure that the hazardous and radioactive wastes at the Weldon Spring Site are cleaned up safely, with no adverse impact on our local community or our natural resources. We continue our commitment to that mission and pledge our continued cooperation with all our community stakeholders to provide the information necessary to resolve these concerns.

A-8 7. Related to item [6], because of the egregious discrepancies noted between the admission in this document (Page nn-n) that recycled uranium is stored in the disposal cell and that the cell Curies are understated by 75% (page 2-16) leads to the suggestion that a cover letter be included with the LTSM plan that is signed by the highest ranking WSSRAP-DOE project officials stating that the data presented in the LTSM plan is *accurate*, *valid* and the *correct data sources* were used.

Response A-8: Inclusion of "recycled uranium" in the summary list of waste types was a mistake. The possibility of recycled uranium at the Weldon Spring Site is fully addressed in response A-7. The error in reporting the total curie count is a simple mistake in a draft document. The curie total is fully addressed in response A-93. Certifications of data or reports must derive from a specific legal requirement in order to be meaningful.

A-9 8. The whereabouts of the thousands of tons of missing fluoride and recycled uranium compounds known to have once been at the site need to be accounted for. Otherwise, one might infer they are still on site but remain unremediated and unaccounted for (see WSCC Commissioner Aubuchon's letter dated <mm/dd/yy> regarding the lost fluoride).

Response A-9: Fluoride was used in the processing of uranium at the WSS. The fluoride was chemically separated from the partially processed uranium metal intermediate and was discarded, along with many of the other process wastes, into the raffinate pits. Fluoride was observed in the raffinate sludge and in the raffinate pit surface water during the site characterization activities but was present in quantities to be considered a contaminant of concern. The raffinate sludge was stabilized and placed into the disposal facility. The surface water was treated and discharged through the site water treatment plant. Surface water, groundwater, and disposal cell leachate monitoring do not indicate the presence of fluoride above any regulatory concentrations.

See response A-7 regarding the accounting of recycled uranium at the WSS.

A-10 9. THIS DOCUMENT SHOULD STAND ALONE. A reader should not have to refer to any earlier stewardship plan draft. If text, tables or figures from another DOE document are referenced that are critical, that material should be part of this stewardship plan. Readers (stakeholders, regulators) may not have ready (or any) access to referenced documents.

Response A-10: Agree that the plan should not reference earlier versions of the plan. DOE may summarize material from other documents in the LTS Plan; when this occurs, DOE will cite those documents.

A-11 10. It is not clear what, if any, of the Missouri Dept. of Natural Resources blunt but constructive criticisms of the previous version of the stewardship plan (those contained in MDNR Director Mahfood's 9/27/01 letter to DOE and Secretary Roberson) have been incorporated into this draft plan. It would have been helpful if these amendments (assuming any were made) had been identified by bolding or underlining. Now one is forced to read the new document line by line to see whether and how Director Mahfood's serious concerns have been addressed in the August 9, 2002 stewardship draft plan. This wastes everyone's time and exhausts their patience, or at least it certainly does mine.

Response A-11: DOE responded to comments from MDNR (transmitted under a cover letter signed by Director Mahfood) on August 21, 2002. The State's comments and DOE responses can be found at http://www.gjo.doe.gov/programs/ltsm/maps/mo-i.htm. In their response, DOE indicates which comments were incorporated into the August 9, 2002, LTS Plan.

A-12 There should be a detailed listing (in an APPENDIX) of all monitoring wells by site, depth, and current status as capped or uncapped, operative now or discontinued.

Response A-12: DOE will not add the monitor well construction details to the LTS Plan. DOE will consider adding this information to annual reports presenting monitoring results, and the information will be readily available through the LTSM Program geographic information system in January, 2003. It is not necessary to include information about abandoned wells in the LTSP as these have been removed and grouted in accordance with state regulations.

A-13 12. The final stewardship plan should be made available in four versions: (a) an "html" web browsable document posted on the GJO-WSSRAP website; (b) a CD-ROM disk as was done for the Preliminary Environmental Impact Statement for Yucca Mountain in Nevada (which I received); (c) as a downloadable PDF (Adobe Acrobat readable) file posted on the web; (d) as a bound printed document.

Response A-13: At the present time, DOE will make the document available on the GJO website and as a printed document.

A-14 13. It should be made clear what is the relationship between this stewardship document for Weldon Spring Site and the long-term stewardship plan for the U.S. Army's Weldon Spring Ordnance Works (WSOW) portion of the Superfund site.

Response A-14: DOE is much further ahead of the Army in stewardship planning, but is open to future consolidation of stewardship activities.

A-15 14. The exact holdings of the Administrative Record to be maintained at the Interpretive Center and St. Charles county library system should be made clear. The issue of whether DOE-WSSRAP reports are/are not "official government documents" mandated to be kept at federal depository libraries under Title 44, U.S. Code, should be fully addressed: (a) because this is stated to be a goal of the LTSM Program on page <nn-n>; (b) because GJO has indicated DOE documents do fall under Title 44; (c) because previous communications from Pamela Thompson in this regard indicate that only the full Administrative record Index, but not all of the documents cataloged therein, will be kept on-site. WSCC and the Social Concerns Committee-ICD (O'Fallon, MO) are on record, including signed petitions to this effect, that the Administrative Record documents should all be physically present on-site in perpetuity. Furthermore, the Interpretive Center which contains them should be manned by a professional records librarian, should be guarded to preclude vandalism and theft, and that the AR documents should be electronically accessible to the public.

Response A-15: DOE will maintain the availability of complete administrative records at the interpretive center for the time period specified by EPA. This may take the form of a computer with Internet connection and printer to access the online document collection or a computer with the collection on CD, or a hard copy set of documents and a copier. DOE rejects the suggestion that the Interpretive Center be staffed by a professional records librarian. It is DOE's understanding that the GPO (Government Printing Office) does not consider the WSS documents to be "official" as defined in Title 44. DOE also does not intend to provide on-site security personnel but has installed reasonable security systems in the Interpretive Center. AR documents for Weldon Spring will begin to begin to be available to the public electronically through the LTSM Program document portal in January, 2003. The on-line system is currently available at http://www.gjo.doe.gov/programs/ltsm/.

A-16 15. Analogous issues for U.S. Army WSOW Administrative Records pertain to item [14]. These issues should also be addressed in the WSS LTSM stewardship plan. I have asked USACE (Bradley Eaton) in a letter I sent to him on <mm/dd/yy> to please clarify these points but, as yet, have received no answer.

Response A-16: See response to comment A-14.

PAGE BY PAGE COMMENTS AND SUGGESTIONS FOR REVISION

Page 1 - Title page.

- Suggestions: No changes.

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Page 2 - Title subpage: performed under DOE contract no. DE-AC13-02GJ79491

- Suggestions: No changes.

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Page 3 - (Doc. No. S00709AC, page iii) Contents 1.0 ... 2.7.3 page 2-27

- Suggestions: No changes.

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Page 4 - (Doc. No. S00709AC, page iv) Contents (cont'd) 2.7.4...4.0 page 4-1

• Suggestions: No changes.

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Page 5 - (Doc. No. S00709AC, page v) Figures 2-2 ... 2-19, Tables 1-2 ...2-13

• Suggestions: No changes.

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Page 6 - (Doc. No. S00709AC, page vi) Tables (cont'd 2-24... 3-20; Appendices A-G)

• Suggestions: No changes.

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Page 7 - (Doc. No. S00709AC, page vii) Acronyms AEC - TSCA

A-17 • Suggestions: Not all of the terms are actually acronyms, e.g. mg/L, pCi/L and µg/L are units of measurement. "Glossary" or "Acronyms and Glossary" might be a better term. The terms "Gross Alpha" and "Gross Beta" should be included and defined. Every term used in this document that might be unfamiliar to a member of the public or to lay stakeholders or non-scientific non-expert regulators should be stated and defined or explained. As is, the list is inadequate and too brief.

Response A-17: DOE will change the title of this page to "Acronyms and Abbreviations." DOE will include a glossary of terms specific to the stewardship of the Weldon Spring site, but assumes a basic understanding of science on the part of the reader. Therefore, some judgment will be required to identify terms for definition. The content of a glossary should be discussed at a working session.

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Page 8 - (Doc. No. S00709AC, page 1-1) 1.0 Basis and Regulatory Requirements.

A-18 **1.1 *Purpose and Scope***

• Suggestions: The "off-site areas" should be mentioned by location and/or name, at least, or described fully here or in another section referenced here. Current language is not sufficient to allow readers to know is being referred to.

Response A-18: DOE will add a reference to Table 2-3, in which off-site areas that require post-closure stewardship are identified. DOE also will add text to Section 2.2.2.2 indicating that vicinity properties were remediated to conditions that allow unrestricted use and unlimited exposure except for the offsite areas identified in Table 2-3. The reference for this will be a pending Remedial Action Report.

1.2 *Legal and Regulatory Requirements*

• Suggestions:

A-19 a) **First paragraph**: "Other hazardous materials" should be identified in a comprehensive manner, e.g. PCBs, lead, arsenic, TNT, DNT, TCE, etc. This information is important enough as to merit a separate APPENDIX (section [H]).

Response A-19: The purpose of this paragraph as titled is to summarize the legal and regulatory requirements and is not the place to identify all the hazardous materials in a

comprehensive manner. The list of contaminants of concern will be included in a table. A comprehensive list of wastes disposed of in the cell will be included in an appendix of the next revision of the plan.

b) **Second paragraph**:

A-20 b.1) "The radioactive materials" in line 1 need to be defined specifically (amounts, isotopes, form) and needs to be comprehensive. Radium needs to be included since this was extensively monitored at the site.

Response A-20: See response to A-19

A-21 b.2) The nature of "Process wastes from the Chemical plant" need to be defined more precisely—what are they (types, amounts, form-liquid, sludge, dirt, etc.)?

Response A-21: See response to A-7

A-22 b.3) Similarly, what are "the contaminated materials from the vicinity properties" (list in a separate APPENDIX).

Response A-22: See response to A-7

A-23 b.4) The exact nature and amounts and form of "Regulated nonradiological hazardous materials" need to be spelled out in detail.

Response A-23: See response to A-7

A-24 b.5) Name the company, date and location of "approved off-site disposal facility." In the other records I have seen, DOE has carefully avoided identifying these contractors. There are allegations that contaminated metals left the site and were placed in a downtown St. Louis scrap dealer's establishment." Again, to preserve document flow, this type of detailed listing should be made into a separate INVENTORY APPENDIX.

Response A-24: This information is available and will be published in the chemical plant remedial action report. Off-site shipments are not relevant to the stewardship of on-site wastes. The wastes from this site were shipped to EPA approved facilities that have the required permits and licenses.

A-25 b) **Third paragraph**: Other documents say the Chemical Pant was added to the NPL in 1989. The exact legal document dates (mm/dd/yy) the Chemical Plant and the Quarry were placed on the NPL should be used rather than these approximate ones. Surely this information is readily available.

Response A-25: The quarry was placed on the NPL on July 30, 1987, and the listing was expanded to include the chemical plant and raffinate pits on March 30, 1989. This information will be incorporated into the LTSP.

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Page 9 (page 1-2)

A-26 • Suggestions: The full relevant text of all of these CFRs and DOE Orders should be included in an APPENDIX (see general suggestion #8). Alternatively (and less dsesirable), the precise method of obtaining all of these documents should be stated in detail (person, agency, location, website URL if available, with phone, fax, e-mail addresses).

Response A-26: CFRs and DOE Orders are readily available to the public and will not be included in this LTS Plan. Regulatory and legal drivers are offered on the LTSM Program web site at http://www.gjo.doe.gov/programs/ltsm/general/proj_info/index.htm. DOE is updating this list to include requirements of the Weldon Spring site. DOE will provide this URL in the text.

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Page 10 (page 1-3)

• Suggestions:

A-27 a) The part of Table 1-2, item 1 "Legal Description of the site" in APPENDIX A is not included in this document which is this noncompliant with the "Guidance for Implementing..." documented cited in the first paragraph. Lack of these important documents makes a thorough review of this draft, the last the public may have a chance to comment upon, impossible. Why was is this key information being withheld since most, or all, of these legal documents have been in place long ago?

Response A-27: The legal descriptions were not yet approved by a DOE real property specialist when the draft LTS Plan was released for review and comment. DOE has since confirmed legal descriptions for the DOE-owned property. The descriptions will be included in Appendix A when the draft LTS Plan is revised.

A-28 b) ***1.3 Role of DOE***. The statement "...the federal government will provide stewardship services at the Weldon Spring site in perpetuity" needs to include the legal or statutory authority that will guarantee this statement will and must be complied with by DOE. Otherwise, this is an empty statement without any legally enforceable "teeth." This is particularly disturbing knowing that the FY 2003 DOE budget for funding WSSRAP stewardship is zero dollars ($0).

Response A-28: DOE is bound by the Records of Decision to implement the remedies. The RODs stipulate that DOE will provide monitoring and maintenance throughout the postclosure period. Because the impounded long-half life radioactive materials at the site will remain hazardous in perpetuity, the postclosure period is perpeptual. The Weldon Spring stewardship budget for FY2003 will be approximately $1 million if Congress meets the President's requested targets.

A-29 c) The last paragraph on this page should be expanded with a table that lists all the duties of the LTSM program in detail. Again, perhaps this should be a separate APPENDIX. This is another example of where the language in this legally enforceable document is too approximate and vague.

Response A-29: The first sentence of this paragraph satisfies this comment. That sentence indicates that DOE is responsible for implementing the LTS Plan. Stewardship requirements and operations are detailed in the plan. The text referred to in this comment is intended to give the reader a sense of the department's stewardship scope.

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Page 11 (Page 1-4)

- Suggestions: No changes to this "End of current text" essentially blank page.

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Page 12 (Page 2-1)

2.0 Weldon Spring Background and Status

2.1. Description of Site.

- Suggestions:

A-30 a) A Table should be included that gives the dates and pages in the St. Charles Recorder of Deed's ledgers when the various properties were acquired, bought and sold. This information should be cross referenced to the documents in APPENDIX A which was (unfortunately and inexplicably) omitted from this third (or possibly more) draft of the WSS long-term stewardship plan. All of the complex land and property transfers described on this page need to be accompanied by dates.

Response A-30: The summary of the site history regarding the various parcels of land is not intended to be comprehensive, nor do we agree that the acquisition dates of the numerous properties is needed in the LTSP. We agree that information regarding the location of recorded real estate instruments will be needed to guide the inspectors. This will be part of Appendix A once these institutional controls are established.

A-31 c) Omitted from this narrative are the key facts that Missouri Research Park and the town of Weldon Spring Heights had themselves exempted from the NPL by EPA. This key information and how it was justified need to be included in this section.

Response A-31: We do not agree with the comment that additional narrative is needed regarding locations in the area which were not targeted for clean-up since they were not contaminated.

A-32 d) The size and dates of all parcels transferred, even minor ones, need to be identified from whom to whom on what exact dates.

Response A-32: See response to comment A-30.

A-33

e) The statement “Legal descriptions of the two parcels are presented in APPENDIX A” is not true and should be changed to “will be” instead of “are.” APPENDIX A is devoid of content in this draft.

Response A-33: Legal descriptions of the site will be incorporated into the next revision of the LTSP.

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Page 13 (Page 2-2)

2.1.2 Physiography and Topography

- Suggestions:

A-34

a) Burgermeister Spring should be mentioned specifically as one of t he “tributaries to (Busch) lakes” and the lakes referred to as drainage areas should be referred to by number. Burgermeister Spring is identified in other DOE site documents as the first place that Chemical Plant groundwater emerges in the offsite vicinity properties, in this case the Busch Conservation Area.

Response A-34: Burgermeister Spring’s hydraulic connection to the Weldon Spring Site groundwater is discussed in Section 2.1.3.2.

A-35

b) The 1997 Imes and Kleeschulte USGS water flow study showing clearly and unequivocally that Quarry groundwater flows into the St. Charles well field was omitted and definitely needs to be included here.

Response A-35: Refer to Response for Comment A-40.

A-36

c) Since DOE collected extensive data on Darst Bottoms groundwater during the early 1990s, the relationship of it to the well field should be stated and explained.

Response A-36: A discussion of background groundwater data for the quarry will be added to the text in Section 2.4.3.2.

A-37

d) The intimate geographic relationship between the Quarry, the SED, Katy Trail State Park and trail, and the Femme Osage slough and the well field should be stated and clarified. For example, it should be stated that SED actually crosses the Katy Trail.

Response A-37: The relationships are clearly shown on the various Figures included in this LTS Plan. No additional details are required.

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Page 14 (Page 2-3)

- Suggestions: No changes.

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Page 15 (Page 2-4)
2.1.3 Hydrogeology
2.1.3.1 Regional
• Suggestions: No changes.
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Page 16 (Page 2-5)
2.1.3 Hydrogeology
2.1.3.1 Regional
• Suggestions: No changes.
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Page 17 (Page 2-6)
2.1.3 Hydrogeology
2.1.3.1 Regional
• Suggestions:

A-38 a) The first paragraph should indicate that dye tracer and flow analyses have shown the three named aquifers communicate with another and the extent to which they do so. The lower depth of the three aquifers should be given. This is necessary to define paths whereby contaminants can potentially (or actually) percolate throughout the entire extent of the alluvial aquifer.

Response A-38: The principal aquifer systems identified in the Weldon Spring area are the alluvial aquifer and the three bedrock aquifers: shallow, middle, and deep. The three regional bedrock aquifers are separated by thick sequences of bedrock that form confining units. The shallow aquifer is composed of saturated overburden, the Burlington-Keokuk Limestone, and the Fern Glen Formation. The shallow bedrock aquifer is separated from the middle bedrock aquifer (Kimmswick Limestone) by 70 to 135 ft of fine-grained limestone, shaley sandstone, and shale, which form a leaky confining unit over the middle bedrock aquifer. Beneath the middle aquifer are 210 to 295 ft of shales and fine-grained limestone that forms a confining unit over the deep aquifer (St. Peter Sandstone to Potosi Dolomite). At the chemical plant, which is located near the groundwater divide, water levels indicate downward gradients and therefore recharge through the bedrock units. Near Burgermeister Spring, the major discharge point for groundwater from the chemical plant, water levels indicate that the shallow and middle bedrock aquifers discharge to Dardenne Creek in this area. The water levels in the deep bedrock aquifer is significantly lower than that of the shallow and middle aquifer and indicates a limited hydrogeologic connection between the deep and upper aquifers. The alluvial aquifer adjacent to the quarry is recharged by the Missouri River and discharge from the Plattin Limestone.

To address the concern about the potential for contaminated water to enter the deep aquifer from directly beneath the chemical plant area, the USGS completed a modeling study to quantitatively assess the groundwater flow system in St. Charles County. A regional three-dimensional groundwater flow model was developed to describe groundwater flow between the shallow, middle, and deep aquifers in the county. The study encompassed 280 square miles, which included most of St. Charles County. The results of the steady state model simulation indicate that 21% of the groundwater flow out of the

shallow aquifer beneath the chemical plant area has the potential to enter the middle aquifer. Approximately 80% of the groundwater flow out the middle aquifer in the same area has the potential to infiltrate into the deep aquifer. The quantity of water infiltrating from the shallow aquifer to the deep aquifer is small, and the time required for water to travel this distance is measured in hundreds of years.

Additionally, a water balance analysis of the Burgermeister Spring drainage was performed to evaluate the interaction of the surface water and groundwater systems. A USGS study indicated that about 25% of the total precipitation falling in the Burgermeister Spring drainage leaves as surface water runoff. Using data from this water balance study, conclusions about the groundwater system can be made. On the basis of the three-dimensional groundwater model developed by USGS, 75% of the inflow to the shallow aquifer in the immediate vicinity of the chemical plant area is derived from precipitation. The average total recharge to the shallow aquifer (vertical infiltration and lateral inflow) is about 3.3 in/yr. using the USGS estimate of 2.5 in./yr. for maximum net recharge to the shallow aquifer from precipitation. The vertical recharge to the middle aquifer is 0.7 in./yr. The average total recharge to the middle aquifer (vertical infiltration and lateral inflow) is about 0.75 in./yr. The vertical recharge to the deep aquifer is about 0.6 in./yr.

This analysis likely overestimates the amount of deep infiltration derived from precipitation at the chemical plant area, because of the losses from the shallow aquifer to the conduit that discharges at Burgermeister Spring. Comparison of the total flow from Burgermeister Spring to the recharge volume to the aquifer from infiltration of precipitation on the chemical plant and drainage area for Burgermeister spring indicates that the discharge volume accounts for 80% of the surface infiltration. If 80% of the infiltration were lost to Burgermeister Spring, the net recharge to the shallow aquifer would be 0.5 in./yr. If it were assumed that the remainder of the USGS model behaves as before, the amount of recharge to the deep aquifer would be 0.1 in./yr., which accounts for less than 1% of the total precipitation on the Burgermeister Spring drainage areas.

As part of the Remedial Investigation, subsurface dye tracing was conducted to determine whether a subsurface hydraulic connection could be detected between Burgermeister Spring and the chemical plant. Three springs in the Burgermeister Spring drainage were monitored for resurgence of injected dye. The data at the springs were collected at close time intervals, along with precipitation data, in an effort to gain further insight into the flow characteristics of the aquifer. Two of the injections showed positive results. Dye was initially detected within 2 to 7 days after injection. The study also indicated that increases in dye intensity coincided with precipitation events, as did the discharge rate at Burgermeister Spring. The results of this study also support the rapid horizontal transport of groundwater in the shallow aquifer once it enters the conduit features.

The text in Section 2.1.3.1 of the LTSP will be modified to include information on the depths to the middle and deep aquifers. There is information in both Sections 2.1.3.2 and 2.1.3.3 regarding the communication of the respective aquifer will each other and no additional text is necessary.

A-39

b) Words like “lithologic” should be defined to enhance understanding of this document, assuming the intent is to communicate with non-scientific stakeholders and regulators (the majority). In other words, the hydrogeologic trade jargon needs to be clearer for persons outside this highly technical field. Diagrams of the aquifer formations would help in this regard.

Response A-39: See response to comment A-17.

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Page 18 (Page 2-7)

- Suggestions: No changes in the Chemical Plant cross sectional view.

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Page 19 (Page 2-8)

- Suggestions: No changes in the Quarry cross sectional view.

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A-40

Page 20 (Page 2-9)

2.1.3.3 Quarry

- Suggestions: The description of groundwater flow from the Quarry is misleading and omits the 1997 USGS water flow study by Imes and Kleeschulte I have referred to earlier. This study showed clear and unequivocal flow from the Quarry into the well field centering on low pressure areas presumed to represent actively pumping drinking water wells (there are nine of them). I directly confirmed this interpretation of the report with Jeffrey Imes by telephone on <mm/dd/02. The description needs to be modified to include these essential facts. The way this section is now written, the possible danger the Quarry and SED runoff posed to the St. Charles county well field is minimized. This oversight needs to be rectified in the next draft and the final plan.

Response A-40: The discussion in Section 2.1.3.3 will be expanded to discuss groundwater flow in the St. Charles County well field. South of the slough, the direction of groundwater flow has an increasing eastward component, due to the influence of the Missouri River and/or pumping in the St. Charles County well field (of which there are 8 active production wells). A figure showing the contoured groundwater elevations will be included in the next revision of the plan to better illustrate the groundwater flow directions in the quarry area.

However, there is no impact on the St. Charles County well field from surface water or groundwater flow in the Southeast Drainage. This drainage is located 0.85 miles downstream of the well field and therefore has no influence on the groundwater quality at the upstream and upgradient well field.

2.1.4 Climate and Vegetation

A-41 • Suggestions: The text about the two Conservation area vicinity properties should be amended to include the fact that Busch and Weldon Spring CAs receive numerous visitors who fish in the lakes, eat the fish, could swim in the lakes, and could drink the spring water and children could play in the creeks, there being no physical or warning signs to preclude such activity (other than swimming).

Response A-41: The text already discusses the existing land uses.

2.2 Site History

2.2.1 Operations History

A-42 This section is historically inaccurate and self serving to federal agencies. The owners of homes in Hamburg, Howell and Toonerville, as detailed in Norman Muschany's book on the subject, were "raped" (land was taken by force by Presidential order without owner's consent; land and homes were clearly not "abandoned"). The Muschany family was forced to appeal to the U.S. Supreme Court to get compensation for their home which was finally awarded in 1945 *after the war in Europe ended*. The word "abandoned" should be stricken and the wording changed to "forcibly taken over."

Response A-42: See response to comment E-7.

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Page 21 (Page 2-10)

2.2 Site History

2.2.1 Operations History

• Suggestions:

A-43 (a) This first paragraph omits two essential facts that impacted public health and safety perhaps for year afterwards and perhaps even today. That is, the munitions plants and Chemical plants released enormous amounts of TNT and uranium compounds into the air such that the ground outside the site took on the color of the compounds. In the beginning, huge amounts (tons) of contaminants were released untreated and unfiltered into the Missouri River. Eye witnesses report the air contained so much uranium on some days it could be seen layering over the morning fog rising
from the bottomland between the Quarry bluffs and the Missouri River (personal communications to Dan McKeel by area residents).

Response A-43: Additional information will be provided regarding how the Chemical Plant, Quarry and vicinity properties became contaminated. The anecdotal information attributed to eye witnesses regarding uranium laden fog attributed to eye witnesses lacks credibility.

A-44 c) Again, dates of land transfers need to be included in the narrative.

Response A-44: See response to comment A-30.

A-45 c) What happened between 1966 and 1981?

Response A-45: The narrative will be amended to include a brief description covering the time period between 1966 and 1981.

A-46 d) Who owned the Chemical Plant and its land between 1966 and 1968?

Response A-46: The Army reacquired a portion of the Chemical Plant, not including the Raffinate Pit area, and between 1966 and 1968. Ownership resided with the United States of America, the federal government. Additional narrative will be added to enhance the readers understanding of the land use and control during this time period.

A-47 e) What did "caretaker status" entail?

Response A-47: "Caretaker status" will be elaborated upon.

A-48 f) Referring to "soils from a uranium ore processing facility in St. Louis" again avoids the real situation and obscures the relationship between the downtown Mallinckrodt Chemical Works site on Destrahan Street (a current FUSRAP site under active remediation) and Weldon Spring site, that being that the MCW Uranium Division supplied workers at both sites and ran both sites. This is historical fact and it should be stated accurately and fully.

Response A-48: Additional narrative will be added to describe Mallinckrodt's role as the contractor to the Atomic Energy Commission. A balance must be struck so that the LTSP does not become a detailed history of site operations. Information which is essential to understanding the nature of the wastes will be added.

A-49 g) This narrative leaves out the fact that in the 1970s University of Missouri officials strongly considered making WSS a graduate engineering campus and using the highly contaminated Chemical Plant as classrooms and laboratories for their students. It leaves out the HOK master plan and considerations of turning WSS into commercial shopping malls.

Response A-49: Whether or not the University of Missouri ever considered acquiring the Chemical Plant for use as a campus, or whether others considered it for a shopping mall, is not relevant. The focus of the LTSP is how the DOE will fulfill its stewardship obligation at the WSS.

2.2.2 Remedial Action History

2.2.2.1 Background

A-50 • Suggestions: The brief first paragraph does not accurately convey what, if any remediation had been performed by the Army, ERDA and DOE between 1966 and 1986 when remediation began. Nor is it clear exactly under what authority remediation was done between 1986-1990 when WSS was placed on the NPL. That is, what were "interim response actions"? They were in response to what imperative or action? Was this under CERCLA or some other authority? Why did DOE "place an on site project office in 1986"? The story is really incomplete and the history of the site is difficult to discern because this connecting information is stated so sketchily or is omitted.

Response A-50: No remedial action of the Chemical Plant occurred prior to DOE establishing a presence at the site in 1986. This will be more clear when the previous section is revised to better describe the caretaker time period. All remedial action at the site was conducted under CERCLA authority. Interim response actions are encouraged under CERCLA so long as these actions do not bias the end result of the public process for selecting a final remedy. The LTSP was deliberately brief in this site history and background since so many of our previous documents addressed these matters. We will add additional information to this section, but it will be summary in nature.

2.2.2.2 Chemical Plant Operable Unit

A-51 • Suggestions:

a) The "contaminated areas on site and on 17 vicinity properties affected by Chemical Plant operations" is mentioned. The details of which exact vicinity properties were affected, and the amounts and types of the specific contaminants, is very important and should be added to the narrative here or inserted as a detailed APPENDIX. A reference to the reports that address contamination at the 17 vicinity properties should be added here as well.

Response A-51: Detailed information regarding the locations of vicinity properties and types of contaminants that remain will be incorporated into Appendix B in the next revision of the LTSP. References to site remediation closeout reports for the vicinity properties will also be included in the LTSP.

A-52 The names of the "vicinity properties" should also be detailed either here or elsewhere in the stewardship plan, because APPENDIX B (now empty) will eventually address (hopefully) Institutional Controls that may be necessary (are so in my opinion at Burgermeister Spring and the SED crossing of Katy Trail) in the off-site vicinity properties.

Response A-52: See response to comment A-51.

A-53 b) Reference"DOE 2002b" is given on page 4-4. This is a very recently issued document which probably is not available to reviewers of this stewardship plan. I do not have a copy of it, and am therefore requesting it immediately as a basis for commenting on this section. This is another example of why the stewardship plan should be a stand alone document *for all essential points it makes* (I consider this passage to be one of the most critical assertions in the entire stewardship plan).

Response A-53: The subject document was sent to you on September 4, 2002. However, this is not the correct reference for the citation in question. The correct reference is the *Remedial Investigation for the Groundwater Operable Units at the Chemical Plant and Ordnance Works Areas* (DOE 1997b). This will be corrected in the next revision.

A-54 The citation passage states the "shallow unconfined bedrock aquifer, which occurs in the Burlington-Keokuk Limestone, is the only aquifer affected by site-related contamination (DOE 2002b) and is therefore of primary interest for groundwater monitoring." This paragraph is another glaring example of unclear writing about a topic that is of utmost importance to be made crystal clear. The issue is the location of the contaminated groundwater which will remain at the site after 10/1/02. Example: "upper leaky and lower confining units" - what is a "unit" in geologic/physical terms? Why are vertical fracture zones not important for groundwater flow? The statement "water table remains within the bedrock" should be backed by a statement how this fact was established inserted into this paragraph.

Response A-54: The passage continues on to present the reasons why groundwater in only the Burlington-Keokuk Limestone is of interest. Groundwater movement is controlled primarily by horizontal bedding planes, fractures, and solution features, resulting in predominantly lateral groundwater movement versus downward movement into the deeper formations. Preferential groundwater movement occurs within strongly weathered portions of the bedrock that coincide with troughs in the bedrock surface, which were likely formed due to weathering along vertical fractures. The underlying unweathered bedrock has lower hydraulic conductivity and a lower occurrence of fractures, both horizontal and vertical, and solution features that result in a lower potential for groundwater to migrate downward versus laterally as in the more permeable upper weathered limestone. Also, refer to response to comment A-38. No additional text will be provided regarding this issue.

"Unit" is defined as a soil or rock bed, geologic formation, or series of geologic formations. "Leaky confining unit" is a lower permeability bed, formation, or series of formations that can transmit water at sufficient rates to furnish some recharge to a well pumping from an underlying aquifer. "Confining unit" is a bed, formation, or series of formations of low hydraulic conductivity that is adjacent t one or more aquifers. These definitions will be included in the next revision of the plan.

The statement that "the water table remains within the bedrock" means that the groundwater does not occur within the overlying overburden but occurs below the top of the bedrock. This statement is supported by groundwater level measurements, which have

been made on at least a quarterly frequency for at least the last 10 years. No additional revisions to the text are warranted.

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Page 22 (Page 2-11)

2.2.2 Remedial Action History

2.2.2.2 Chemical Plant Operable Unit

A-55 • Suggestions: The second line of paragraph #1 lists many cell inventory items that were not listed in Pam Thompson's <date: mm/dd/yy> to my letter of <mm/dd/yy> which asked for a "complete inventory of the radioactive and non-radioactive components of the disposal cell." Specifically not mentioned was recycled uranium which WSSRAP denies receiving even though DOE's legacy project, Ohio Office report, Appendix a-4 states that Weldon Spring Site received 74,000 metric tons and distributed 70,000 tons of this material. Thus the stewardship and Ms. Thompson's fact are in total disagreement. This is very important because recycled uranium (previously irradiated nuclear fuel) contains plutonium, technetium and neptunium plus other fission-associated transuranic radionuclides. One must conclude that either the information in the stewardship plan is incorrect, or that it is correct and Pam Thompson's and WSSRAP's information previously provided to me was, in fact, not correct. This raises the possibility that I was deliberately mislead which is, of course, extremely disturbing. *This glaring discrepancy obviously needs to be resolved*.

Response A-55: See responses to comments A-7 and A-8.

A-56 Besides RU, other items said to be in the cell but not listed in Ms. Thompson's previous response are "building debris, asbestos containing materials, drums, process equipment." Neither Ms. Thompson's previous response letter nor this plan provides what is needed—a detailed, complete, and accurate listing of every item in the disposal cell arranged on the positioning grid map. This would allow future generations the opportunity to know exactly where (x,y grid) in the cell all contaminants are located. This key information should be made into a separate APPENDIX.

Response A-56: See response to comment A-7. The placement of the wastes into the cell was rigorously tracked and overseen by engineers and quality control personnel. Waste was placed in the cell in an engineered and controlled manner and was stabilized with the following criteria in mind:

1) Construction of a dense and stable waste configuration capable of supporting the cell cover;
2) Minimization of the resultant volumes of placed waste through an engineered, judicious, process of commingling various waste streams;
3) Strategically placing waste forms so as to avoid potential incompatibility.
4) Minimization of the volumes of leachate and surface water necessitating treatment.

The majority of the containers and debris were entombed in the chemical stabilization/solidification grout, and remaining debris was surrounded by soils. An

inventory of the wastes placed in to the cell on a grid basis is not necessary for stewardship purposes.

2.2.2.3 Southeast Drainage Removal Action

A-57 • Suggestions:

a) Paragraph one last sentence states "spring water was contaminated" is too vague since there are dozens of springs on-site and in the vicinity properties. The exact spring (name and/or DOE number, e.g. Burgermeister 6301) should be stated.

Response A-57: Text will be revised to identify the springs that are being discussed. However, flor clarification purposes, there are no springs on the chemical plant or quarry sites.

A-58

b) Paragraph 2 states "**DOE assessed health ... risks posed by the contamination levels**." Since to my knowledge DOE does not have on staff physicians, *who*, *how* and *when* (exactly) were these health risks assessed? Was there a formal epidemiologic study, and, if so, who performed it (MDOH, ATSDR, etc.)?. The professional level of training and medical qualifications of the persons performing the health assessment should be stated (nurses, physicians, MPH, health physicist Ph.D.s, etc.). The public has a right to know whether the health assessment was rigorous and whether the results can be trusted; they deserve to know the full basis that validates DOE's ability to make this claim. Unless qualified personnel using proper methods did the assessment, then public confidence about the "did not pose unacceptable risk to human health or the environment" would be undermined. As for me, I would have no confidence in the validity of this statement unless the requested information is provided. I would never sign off of this LTSM plan unless and until this documentation is provided in full. I would regard the alluded to statement as simply self-serving groundless rhetoric.

Response A-58: The potential risk to human health and the environment was evaluated as part of the CERCLA documentation required to support the removal action conducted at the Southeast Drainage. This report is the "Engineering Evaluation/Cost Analysis for the Proposed Removal Action at the Southeast Drainage near the Weldon Spring Site, Weldon Spring, Missouri", dated August 1996. The risk evaluations were conducted following the recommended EPA methodology and procedures for Superfund sites as given in their guidance entitled " Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual (Part A)" issued December, 1989. Standard EPA risk scenarios and exposure assumptions were used in the evaluations. The exposure scenarios and assumptions presented in the EE/CA were discussed beforehand with EPA and the MDNR/MDOH. All parties agreed at that time that the scenarios chosen were reasonable representations of the current and foreseeable future land use at the Southeast Drainage. The EPA and the MDNR/MDOH reviewed and commented on the draft reports before regulatory approval of the report for finalization and publication.

A team of qualified and experienced environmental health scientists from the Argonne National Laboratory performed the evaluations that involved the following 4 general steps consistent with the EPA methodology for risk assessments: (1) chemical and radiological contaminant data evaluation to determine exposure concentrations, (2) the identification of completed exposure pathway(s) or exposure assessment, (3) toxicity assessment, and (4) risk characterization. The data and procedures used in the assessments were obtained from approved EPA documents for use in CERCLA risk assessments. The EPA and the MDNR/MDOH were consulted in these evaluations as noted above. Similar assessments have been, and are continuing to be performed for other radioactively contaminated sites in the country, including those located in St. Louis County, Missouri.

A-59 The pertinent portions of the referenced DOE 1999B "Southeast Drainage Closeout Report Vicinity Properties DA4 and MDC7, DOE/OR/21548-722, etc." should be included here. Again, many readers of the stewardship plan will not be able to access this document. It would be helpful to know if a copy is/will be available at the Interpretive Center as part of the WSSRAP Administrative Record.

Response A-59: A more appropriate reference for the text presented is the EE/CA report mentioned in Response A-58. A description of the risk assessment performed and the results obtained will be summarized and presented in the next version of the LTSP.

A-60 **Footnote**: At a DOE public meeting in St. Charles, MO held on <mm/dd/yy>, and in a letter dated <mm/dd/yy> I asked Pamela Thompson, WSSRAP project director, to clarify whether any physician had ever been assigned to the staff at WSSRAP and the answer was "no." I was sent the health monitoring protocol for workers at the WSSRAP site which I judged to be inadequate in several important aspects: (a) the description I got was very brief and was an incomplete *protocol that merely stated the site was in compliance with federal and state regulations without specifying how it was so* (e.g., I later learned that stool samples had been tested for plutonium in WSSRAP workers in a response letter from Thompson-DOE);

Response A-60: The health and safety of site workers are monitored following EPA, state of Missouri and DOE protocols. These protocols include routine health checkups and testing of workers by physicians and other qualified technicians under contract to DOE to perform this task.

A-61 (2) the 1997 ATSDR WSSRAP health assessment was almost exclusively based on a review of *historical records* provided by DOE; there was no new medical or epidemiologic data on the workers or the St. Charles county population collected as part of the 1997 ATSDR health assessment report.

Response A-61: The 1997 ATSDR health assessment was performed by the ATSDR independent of WSSRAP. The ATSDR employed their own procedures for conducting the health assessment for the Weldon Spring site consistent with other assessments they have performed for other sites or areas.

A-62 I am aware of the MDOH 198n report on a leukemia cluster in St. Charles county, MO which found a higher than expected rate of leukemia in females aged 0-44 years but could not link those excess leukemias to activities at the Weldon Spring Superfund site.

I am also aware of the publication by Dupree-Ellis et al (Amer J Epidemiol, July 2001) on excess cancer mortality and nephritis (inflammatory kidney disease) in 2541 former male MCW workers.

Response A-62: Comment noted.

2.2.2.4 Ground Water Operable Unit

A-63 • Suggestions:

a) Paragraph 2 should state that the Quarry Interceptor Trench final report has been submitted and that the result was a disappointing removal of less than 1% of the uranium contamination in capture area groundwater. The uranium burden was grossly underestimated at the inception of this pilot remediation study.

Response A-63: A detailed discussion of the results of the field study is not needed in a plan outlining the long-term monitoring for the Quarry Residuals Operable Unit. The summary discussion indicates that the study was performed and no additional evaluation is necessary. The completion report for this study is referenced if the reader wishes to obtain detailed information regarding the study.

The objective of the quarry interceptor trench field study was to confirm model predictions of the effectiveness of groundwater extraction systems to remove uranium from the shallow aquifer of the basis of field data. The efficiency of the interceptor trench system was defined as the ratio of the cumulative mass of uranium removed to the initial total mass present within the capture zone of the trench. The percent removed was significantly below the predicated performance of the trench (10% mass removal within the first 2 years) and it was concluded that further evaluation of groundwater treatment was not warranted. The percent removed was not low due to a “grossly underestimated” mass of uranium. It was low because the predictive model used optimistic data to illustrate that even under ideal conditions, the active remediation of uranium contaminated groundwater was not feasible.

A-64 b) Paragraph 2 (pending) should be expanded to state what the target date is for issuing the groundwater ROD. It could also indicate the preliminary current status of the TCE remediation pilot effort. It should also state why DOE does not believe further remediation of the groundwater uranium excess is possible or necessary.

Response A-64: Presenting a target data for the issuance of the ROD would be premature given the complexity of the issues surrounding groundwater at the chemical plant. The text will be expanded to include a summary discussion regarding the status of the TCE pilot scale project. DOE will address results and identify the final remedy for TCE, nitrate, nitroaromatic compounds, and uranium under the CERCLA process, which includes public

participation after presentation of the proposed plan. Additional discussion regarding this issue is not appropriate in this plan.

A-65 Comment: I fully anticipate and predict the ROD will adopt the expedient, less costly "doing nothing" (further) option. The public needs to have additional input into this Groundwater ROD decision and to its incorporation into the LTSM plan (this document revised). **It should also be noted for the record that I believe the site should not have been turned over for LTSM until the GW ROD had been issued, implemented, and remediation under it had been completed**.

Response A-65: See response to comment A-64.

2.2.2.5 Quarry Bulk Waste Operable Unit

- Suggestions:

A-66 a) The next to last sentence should be expanded to state what the water treatment and NPDES permit accomplished, specifically. The treatment goals and actual results should be stated and compared. The rationale for discontinuing water treatment should also be stated—was all the groundwater radioactive and non-radioactive contamination 100% remediated, for example? Or, if contamination remained, what and how much remained and why was it deemed acceptable to cease the water treatment effort (I presume because the cell was capped and the Quarry was backfilled)? If my surmise is correct, then these facts should be stated clearly.

Response A-66: The WSS has an NPDES permit for the Quarry and the Chemical Plant that includes water treatment plants at the site and the quarry, the package sanitary wastewater treatment plant at the administration building , and several stormwater outfalls at the chemical plant and the quarry. The permits established effluent water quality limits or monitoring requirements for the discharge of treated water or surface water runoff to the receiving bodies. The water treatment plants treated water from various locations around the chemical plant and the quarry such as the raffinate pits, the TSA, the quarry pond, decontamination water and the disposal cell. All of these sources are gone or, in the case of the disposal cell leachate, have alternative management options.

If groundwater treatment were identified as the final remedial action for the Chemical Plant groundwater, a separate NPDES application and approval process would be required.

Providing the monitoring results is not pertinent to the purpose of the LTSP and will not be included. This information is available to the public through the MDNR St. Louis Regional Office for those interested.

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Page 23 (DOE Page 2-12)
2.2.2.5 Quarry Bulk Waste Operable Unit (cont'd)

- Suggestions:

A-67 b) The rationale behind DOE's decision that abandoning the long effluent pipeline in place was acceptable. This pipeline must have contained residual radioactive and chemical contamination. State what "grouting the ends" accomplish related to promoting long term stewardship and the public health and safety. The nature and extent of this residual pipeline contamination should be stated clearly. The amount of residual risk it poses to the public health and safety should be stated. How deep is it buried? Its exact location should be given on a map. None of these things are addressed in the present document.

Response A-67: The discharge pipeline from the quarry has been abandoned in place and poses no risk to human health or the environment. The discharge pipeline from the Chemical Plant area will be maintained should leachate from the cell be required to be treated on site in the future.

The location of the quarry pipeline is not relevant because possible future disturbance poses no risk. The location of the Chemical Plant area pipeline is shown on figure 2-16. This drawing will be revised to more accurately depict the location of this pipeline.

A-68 c) In the last paragraph of this section "northeast slope area in 1995" (where additional soil contamination) should be referenced to its location on a map and the *nature* (composition, amount) of the soil contamination should be identified.

Response A-68: Remediation of soil contamination in the Northeast Slope area of the Quarry was completed in 2000 as part of the Quarry Residuals Operable Unit. Contaminated soil was removed to cleanup levels. Fixed contamination remaining on bedrock in the Northeast Slope area was determined through an evaluation to meet the As Low As Reasonably Achievable (ALARA) cleanup standard. The Northeast Slope area is included within the quarry proper institutional control.

A-69 ***2.2.2.6 Quarry Residuals Operable Unit***

- Suggestions:
  a) State who made the exposure assessments (DOE, ATSDR?) and where these data are reported (a document reference or better, an excerpt) is needed here or anywhere that a public health and safety issue is addressed in the LTSM plan.

Response A-69: A baseline risk assessment (BRA) was conducted for the quarry area as part of the RI/FS process and documentation to support the Quarry Residuals Operable Unit. This report is the "Baseline Risk assessment for the Quarry Residuals Operable Unit of the Weldon Spring Site, Weldon Spring, Missouri", dated February 1998. A brief summary of this evaluation will be included in the next version of the LTSP.

A-70 b) Did the "exposure assessments under current and reasonably anticipated land uses" include the actual current plan to reroute the Katy Trail through the Quarry (as shown on Page N-N of this document)? The rationale for doing so is not immediately obvious, and at first blush, seems like a very imprudent and capricious decision. Was this rerouting done

with the concurrence of MDNR? As far as I am aware, this decision has never been submitted for public comment. I, for one, would obviously be opposed. One wonders if the rationale could be to highlight the effectiveness of Quarry remediation or to divert visitor's attention to the massive collection of monitoring wells now located along the Katy Trail near the Quarry. If either of these are true, then the rationale would be truly flawed and the route change would be doubly inadvisable.

Response A-70: There have never been any plans to re-route the Katy Trail through the Weldon Spring Quarry. The Katy Trail will remain in its present configuration. The newly constructed Hamburg Trail will connect with the Katy Trail at the Quarry, run roughly parallel to State Route 94 to the Weldon Spring Interpretive Center, and end at the August A. Busch Memorial Conservation Area. The construction of the Hamburg Trail was approved by Energy Secretary Bill Richardson , Missouri Department of Conservation director Jerry Conley, and Missouri Department of Natural Resources Director Stephen Mahfood through the August 4, 1999 proclamation.

A-71

c) The result of the water interceptor trench 2 year experiment was to vastly increase the estimate of the uranium mass still contaminating the groundwater (less than 1% of it was removed even though earlier reports indicated the 10% remediation "goal would be met less than half the way through the experiment." (cite where this statement is made elsewhere in this report, Page n-NN). The statement that QWIT "verified the predictive model" seems inaccurate;QWIT actually proved to be a very *ineffective* remedy, with less than 1% of the uranium removed, especially under drought conditions that have existed at the site for several years and were known before the interceptor trench was installed. One might argue and conclude from the results that the tested remedy, interceptor trench, which was also signed off on by MDNR, was not the best groundwater treatment alternative.

Response A-71: The objective of the quarry interceptor trench field study was to confirm model predictions of the effectiveness of groundwater extraction systems to remove uranium from the shallow aquifer of the basis of field data. It was agreed to perform the study because modeling was performed with limited site-specific data and it was speculated that actual field conditions might indicate a more optimistic removal of uranium. The percent removed was significantly below the predicated performance of the trench (10% mass removal within the first 2 years) and it was concluded that further evaluation of groundwater treatment was not warranted. The percent removed was not low because the estimate of the mass of uranium increased, it was because the predicative model used optimistic data to illustrate that even under ideal conditions, the active remediation of uranium contaminated groundwater was not feasible. The model used an estimate of 1,200 kg of uranium while it was calculated during the study that 1,700 kg of uranium was present, but only 900 kg was available to the trench. The difference between the original estimate and the refined calculation based on field data had no bearing on the conclusion of the study.

The conclusion of the study was that active remediation of groundwater using an extraction method is an ineffective remedy. However, compared to the other remedies, it was deemed to be the most likely to succeed and therefore was evaluated under this study.

The study was not performed during drought conditions. During the beginning of the field study, the water levels were lower than anticipated, however, the water levels in the study area fluctuate based on the water levels in the Missouri River. During other portions of the study, the water levels were higher than average and significant amounts of water were removed.

A-72

d) "These materials" (line 2 of final paragraph) that were remediated and placed in the disposal cell should be named and the amount given. Being specific is always better than being approximate as occurs throughout this legal document and thereby weakens it as a believable roadmap and guidance to future knowledge-based decision making.

Response A-72: See response to comment A-7.

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Page 24 (DOE Page 2-13) - Table 2-3 Areas subject to institutional controls

- Suggestions:

A-73

a) This table needs to be expanded to include groundwater IC at the vicinity properties, especially Burgermeister Spring (DOE 6301) and Creek in the form of warning signs about specific contaminants ad barriers to public access. If the "Chemical Pant ground water 1st column box refers to these off-site locations, then the off-site locations should be named.

Response A-73: Institutional controls for groundwater will be established under the Record of Decision and implementing workplans for the Groundwater Operable Unit. This could include springs such as Burgermeister, or springs in the Southeast drainage. It is not anticipated that warning signs or barriers will be necessary since the public can come into contact with these waters and suffer no adverse impact given the current recreational use of the land. Institutional controls will be needed only to maintain the recreational status of the land.

A-74

b) **The Southeast Drainage 1st column box needs to be amended to say "between the Chemical Plant boundary and the [crossing point] of the Katy Trail and its termination." ICs are also needed where SED crosses Katy Trail, which also should be acknowledged with MDNR inserted into the "Property Owner" last column**.

Response A-74: The Southeast drainage passes under a bridged segment of the KATY trail. It is our current understanding that the MDOC is the only property owner in this area. We will confirm property owners as we proceed with implementing institutional controls.

A-75 c) The “Quarry area north of Femme Osage Slough” needs to be amended to say “...and the portion south of...” since the southernmost boundary of the postulated reduction zone has not been proven to coincide precisely with the northernmost bank of FOS. Jeffrey Imes of USGS-Rolla in a recent phone conversation with me stated he also doubts the contaminated groundwater plume stops at FOS, and that he knows of no data that supports this contention. His opinion on this vital matter is important since he co-authored the USGS 1997 groundwater flow study that defined water flow extends from the Quarry site into the St. Charles county well field that lies south of FOS between it and the Missouri River. The entire alluvial aquifer is in equilibrium.

Response A-75: Although the reduction zone extends south of the Femme Osage slough, the greatest impact is observed at the location where geochemical conditions change (oxidizing to reducing), which is located north of the Femme Osage slough. A distinct contact was evident across the area north of the slough separating alluvial soils with characteristics indicative of oxidizing conditions from those indicating reduced conditions, which was consistent with observations made during several investigations. The transition from the oxidizing to reducing conditions can either be sharp or gradational, occurring over a few inches up to several feet. Evidence for rapid precipitation of uranium from groundwater was indicated by a thin zone in the soil column exhibiting uranium concentrations immediately below the oxidized/reduced zone contact and decreasing to generally low concentrations with depth. This indicates rapid precipitation in response to a change in the groundwater oxidation sate across the oxidizing/reducing zone contact at this location.

The distribution of uranium in the groundwater was constructed from data collected from monitoring wells located both north and south of the Femme Osage slough. Figure 2-15 depicts the extent of uranium greater than 20 pCi/l. Several monitoring wells located north of the slough indicate levels equal to background. These wells are located in the reduced portion of the aquifer and support the precipitation of dissolved uranium in groundwater.

A-76 c) Point [c] raises the additional consideration that a diagram of the exact position of the postulated reduction zone should be provided in the LTSM plan. I have never seen such a diagram, so if one exists it would be very useful to include it here.

Response A-76: Section 2.3.3 will be expanded to provide more detail regarding the location of the oxidation/reduction boundary north of the slough. A figure detailing the exact location of the boundary is not necessary for the summary presentation in this report. Reference will be made to the completion report for the geochemical characterization if the reader wishes to obtain more detail on the subject.

A-77 d) Kent Barbee, a resident at Busch Wildlife area during the time the Chemical plant was in operation in the 1950s and 1960s claims his father Willard Barbee (perhaps the first Busch superintendent) spread PCB-containing oil around every Busch lake as an insect repellant. PCBs are now an established human carcinogen, banned from the marketplace. Drums with PCB oils were found on-site yet are not

mentioned in this Table. Have PCBs been investigated around the Busch lakes and remediated?

Response A-77: Activities alledgedly performed by the MDC on its property have no bearing on DOE long term stewardship.

A-78 e) Have 100% of heavy metals—arsenic, lead and cadmium—in soil and the Busch lakes been remediated?

Response A-78: The metal contaminants of concern identified in the Chemical Plant Record of Decision, which also covered the Busch Lakes, were arsenic, chromium, lead and thallium. These metal contaminants were not present in the Busch Lakes at levels above the cleanup standards. The soils at the chemical plant area were remediated for metals to the cleanup standards identified in the Record of Decision. See the Table below.

Parameter	Number of Samples	Average Concentration	Background Concentration	ALARA Cleanup Goal	Percentage of Results below ALARA
Arsenic	2782	8.19 mg/kg	26 mg/kg	45	99.9%
Chromium	3090	17.37 mg/kg	36 mg/kg	90	100%
Lead	2687	18.22 mg/kg	34 mg/kg	240	99.7%
Thallium	1082	1.78 mg/kg	16 mg/kg	16	99.8%

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Page 25 (DOE Page 2-14)

2.3.1 The Chemical Plant

• Suggestions: This section should be modified as follows to rectify several glaring factual omissions and scientifically inappropriate rationalizations that compromise public health and safety:

A-79

Paragraph 1: Did the Chemical Plant residual risk assessment show that all soils had been remediated or that the average risk was acceptable following the cleanup? "Contaminated soil" should be defined by specific types of contaminants.

Response A-79: The Chemical Plant residual risk assessment used all data collected after remediation. It assessed this data in ½ acre confirmation units (CUs) in order to evaluate a potential future residential scenario. It also evaluated the entire set of data. The LTSP will be revised to include a summary table of the data comparing post-remediation soil contaminant levels to the cleanup criteria established in the Chemical Plant ROD.

A-80 Paragraph 2: **The term "*will remain under U.S. government control in perpetuity*" is a bold statement that needs to be defined in terms of the legal or statutory basis in order to make it credible**. The history of the site records numerous land transfers and sales of various Weldon Spring site properties to the University of Missouri, the state of Missouri (Research Park), and the Missouri Dept. of Conservation.

Response A-80: Please see the response to comment A-28 and E-1. Federal ownership is one way to restrict land use, but DOE will also impose a deed restriction which will 'run with the land' and restrict use into the future even if ownership changes.

A-81 This document currently lacks both Appendix A and B documents that will presumably contain this crucial documentation. Again, since the land and tangible property transfers occurred decades ago, it is difficult to understand their absence from the draft LTSM plan (this document).

Response A-81: See the response to Comment A-5.

A-82 Paragraph 3: The statement regarding Burgermeister Spring 6301 that "DOE will pursue an agreement with the landowner (isn't this MDOC? then say so) to ensure land use remains restricted" is an affront to the truth and common sense. This agreement should have been put in place years ago. There are no (zero) current physical access restrictions (barriers) or warning signs to the public to prevent their access to the contaminated Spring or to the Creek that flows from it to Lake 34 in the Busch Conservation area. The reason for this oversight is really difficult to imagine, especially in view of the admission that there remain "slightly elevated concentrations of contaminants of concern." This is quite a different statement than the WSSRAP website which assures the public it is "safe for them to drink the Burgermeister Spring water." In recent communications to MDNR (Robert Geller, Steven Mahfood, Larry Erickson and Ben Moore) I contended that such an assertion is irresponsible and should be retracted absent supporting expert medical opinion in support of the DOE position. I restate the same opinion here.

Response A-82: DOE will indicate the landowners of record when the LTS Plan is revised. On the basis of exposure scenarios consistent with current land use, the amount of contaminants in the spring water does not pose unacceptable risk. No physical barriers are warranted around this spring. The risk assessment assumes a visitor will consume 400 mL of water on 20 occasions per year for 30 years and calculates radiological risk to range between 4 x 10E-9 and 3 x 10E-6, the chemical risk to range between 3 x 10E-10 and 6 x 10E-7, with a hazard index of between 0.001 and 0.4 (see Section 1.3.1.2, *Feasibility Study for Remedial Action for the Groundwater Operable Units at the Chemical Plant Area and the Ordnance Works Area, Weldon Spring, Missouri* (DOE/OR/21548-569, March 1998 [the GWOU FS]). If the risk is between 10E-4 and 10E-6 and the HI is less than 1, EPA guidance specifies that risk is acceptable (*Guidance on Remedial Actions for Contaminated Groundwater at Superfund Sites*, Interim Final, EPA/540/G-88/003, December 1989). The GWOU FS states, "Neither carcinogenic risk nor systemic toxicity is indicated for the recreational visitor incidentally ingesting springwater at the 15 springs evaluated…" Contaminant concentrations were based on either maximum concentrations or the average concentrations at the 95 percent upper confidence limit.

A-83 Paragraph 4: How can the statement be made "in inaccessible areas along the Southeast Drainage?"

Response A-83: The intent of the discussion was to indicate that some of the areas with known contamination are difficult to access for the current recreational visitor to the Southeast Drainage. This will be clarified in the next revision.

A-84 *First*, the specific contaminated areas of SED need to be located on a map giving location and depth and amounts of the contaminants.

Response A-84: Areas where contaminants remain in the Southeast Drainage are identified in site characterization studies. As it is not necessary to include this level of detail within the LTS Plan, these documents will be included by reference. See also the response to comment A-58.

A-85 *Second*, to my knowledge there are no physical barriers, no warning signs about the named radioactive contaminants, no fences along SED to prevent public access.

Response A-85: DOE does not intend to install fences or signs at the SED because the evaluations conducted indicate that under current land use (i.e., for the recreational visitor scenario), contaminant concentrations are within the acceptable risk range recommended by the EPA for Superfund sites. See also the response to comment A-58.

A-86 *Third*, the term "inaccessible" implies impossible to access and this is not actually so, is it? A more accurate phrase might be "somewhat difficult to access."

Response A-86: Text will be revised to clarify as suggested. See also Response A-83.

A-87 *Fourth*, this section should include an explanation why the named contaminants have not been remediated completely (cost, no time, etc.), although it is hard to imagine why this has not been accomplished after 13-16 *years* of active remediation. This is another glaring example of where Institutional Controls are long overdue as has been pointed out in the last three MDNR quarterly environmental monitoring progress reports. Also again, why has DOE failed to "pursue an agreement with the landowner" (is this MDOC? Again, then say so) long ago. DOE's reasoning and rationalizations are unconvincing and self-serving and are not in the best interest of public health and safety, nor are they persuasive. Decisions such as this are in large part responsible for public lack of confidence in DOE and EPA and the CERCLA/Superfund process. By the way, children love to play in open culverts!

Response A-87: The contamination in the Southeast Drainage was evaluated under both a recreational user risk scenario (the current and expected future land use) and a modified residential risk scenario (potential future land use). Prior to remediation, under a recreational risk scenario, levels within the Southeast Drainage were protective and did not pose an unacceptable risk to human health and the environment. Through meetings with state and federal regulators, it was decided to design the cleanup around the modified residential use scenario for an added level of conservatism. The remediation work brought contamination levels to within acceptable risk levels for the modified residential scenario.

The entire length and width (100' from each side of the centerline) of the Southeast Drainage is being designated as an institutional control area in order to prevent building and development within the drainage itself.

A-88 Related to both paragraph 3 and 4, the intention to "pursue an agreement" is inadequate and alarming—the document needs state how a legally binding agreement has been negotiated and signed and a copy of the agreement needs to be placed into Appendix B.

Response A-88: The fact that a real estate agreement is not yet in place with the MDOC should not be alarming since the agreement will simply perpetuate the current non-residential use of the Southeast drainage. The next revision of the LTSP will contain the proposed language of this agreement.

A-89 Paragraphs 5 and 6: DOE's rationale (too costly) for avoiding complete remediation of the SED and county route D three culverts is unacceptable given the fact that the total remediation cost approximates $900 ± 50 million dollars already.

Response A-89: The current potential exposure to the culverts under Highways 94 & D present no risk to recreational users or construction workers. The language of an agreement, which will be included in the next revision of the LTSP, will assure that DOE is informed of any future excavation of these areas in order to assure proper disposal of residually contaminated soils or debris.

A-90 The future promises should be backed up by legally binding agreements made between DOE, EPA and the proper Missouri entities (MDOT?). A copy of the legally executed document should be placed in Appendix B (institutional Controls).

Response A-90: WSS – DOE has committed to developing and implementing appropriate ICs and presenting them in the LTS Plan.

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Page 26 (DOE Page 2-15)
2.3.1 The Chemical Plant (cont'd)

- Suggestions:

A-91 a) Paragraph 2 needs to be amended to include a statement verifying that radioactive and chemical contamination of the haul road, soon-to-be Hamburg trail have been completely remediated. I recently asked for this data in a letter to Pamela Thompson dated ,mm/dd/yy> as documentation that public access as to the converted hiking trail is in fact entirely safe.

Response A-91: The Hamburg Trail (formerly the quarry haul road) was routinely scanned during its operation as a haul road and determined to be clean. Additionally, a survey was conducted after all the wastes were transferred to the Chemical Plant and this too proved that the haul road was clean. It is worth noting that haul trucks were decontaminated and

scanned prior to being allowed to travel the haul to ensure that the haul road did not become contaminated and this process was very effective.

A-92

c) Petitions signed by more than 800 St. Charles county citizens who are opposed to making an access road to the top of the cell as a tourist attraction as being inappropriate use, to having an unmanned Interpretive Center, and to creation and use of the Hamburg Trail were presented to Pamela Thompson and county Executive Joe Ortwerth. In addition, Kay Drey wrote letters to both Tom Ridge, director of the Office of Homeland Security, and to Congress strongly protesting against free public access to the cell as actually facilitating terrorist access and conversion of the cell into a "dirty bomb." I offered support of these sentiments in a story I wrote for the Confluence newspaper that has a St. Louis circulation of 10,000 copies. We can offer large amounts of media documentation from terrorism experts that this is a real and credible possibility. None of this opposition is even acknowledged in this plan—such an omission is misleading and self serving. DOE needs to strongly defend why it has completely ignored this public sentiment. Our petitions have remained unacknowledged and without any official response from DOE that public input, apart from the WSCC, has not even been considered on these vital stewardship matters.

Response A-92: See response to comments A-70 and A-206.

A-93

2.3.2 Disposal Cell (document page 2-15 Doc. No. S00790AC, DOE/GJO August 9, 2002)—This passage is found on sequentially numbered *page 26*.

- Suggestions:

a) ***This section contains the most flagrant and serious mis-statement of fact in the entire document which appears to be an alarming attempt to mislead the public***. That is **"... with a radioactivity of 4,000 curies, are stored in the cell."** [underlining is by the author for emphasis] As mentioned for the discussion of Figure 2-6 on Page 2-nn, I have in my possession letters (Paul McCracken dated <mm/dd/yy to Kay Drey, and from Pamela Thompson dated <mm/dd/yy> to Daniel McKeel, M.D.), from the former and the present WSSRAP project directors certifying, as official DOE responses to questions we posed, that the **disposal cell in fact contains a total of 7,044 Curies of radioactivity**. This discrepancy equates to a an underestimate of the actual radioactive content of the cell by 3,044 Curies. The preparers of this draft plan owe the public a full and detailed explanation of how this error occurred. What data sources did they use to obtain the 4,000 curie number?

A key data reporting error of this magnitude of arguably the most important number in the entire report *casts doubt on the accuracy and validity of all the data in the report*. At the very least, the error implies the LTSM draft was put together hastily and was not "fact checked" by knowledgeable DOE-WSSRAP personnel.

This major error calls into question the validity the *process* used to create this draft plan. The document creation process needs to be described including the extent of input from the WSSRAP on-site remediation team. Was this plan created solely by GJO or was it a true collaborative effort by site personnel and GJO?

Response A-93: A final total activity estimate for the cell (6,600 Ci) has been prepared which includes activities for the major uranium, radium, and thorium isotopes in the natural uranium and Th-232 decay series. These calculations are attached. See also response to comment A-7.

A-94 It also calls into question the competence of the GJO DOE office to assume a leadership role in long term stewardship of the site if they cannot accurately report one of the most basic facts (total radioactivity of the contents) about the Weldon Spring disposal cell.

Response A-94: Comment noted.

A-95 Once again, availability of a detailed inventory of all of the disposal cell contents might have avoided this error. Providing this detailed documentation I requested to the public should be done immediately. I do plan to make a FOIA request for this information if it is not sent to me right away upon receipt of these comments by DOE-GJO-WSSRAP. The inventory should be a separate APPENDIX of this draft LTSM plan.

Response A-95: See response to comments A-7 and A-56

A-96 c) RE paragraph 3, color baseline photographs of the various component layers of the cell should be attached as a separate APPENDIX to document the baseline appearance of components of the non-degraded cell. These photos would serve as useful comparisons to photographs taken at future site inspections when the components begin to degrade (some of the liners have an expected lifetime of only 40 years, for example).

Response A-96: Because subsurface layers within the cell will not be exposed to visual observation, DOE will not include photographs of these in the LTS Plan. Construction photographs will be included in the permanent site record managed at the Grand Junction Office.

A-97 d) RE paragraph 4: A diagram (Figure) of the two bays and their contents should be included and referenced in this section and to the detailed cell inventory APPENDIX material that I recommend being incorporated into this report.

Response A-97: See response to comments A-7 and A-56

A-98 e) RE paragraph 5: What does the term “low-radioactivity soil” mean? What is the reference baseline against which the soil is compared to label it “low radioactivity”?

f) Where did this soil come from, was it the Borrow Area or some other source. The term is also ambiguous in that it might be interpreted to mean that radioactively

contaminated soil was intentionally used to line the cell! (I am assuming this latter possibility was not the case).

Response A-98: The soil in questions was contaminated material of generally lower radioactivity than other contaminated soils. DOE did not dispose of uncontaminated material. Less-contaminated material was mixed with the peat because the intent of this layer is to adsorb additional radioactive contamination to reduce contaminant concentrations in leachate. As indicated in the text and shown on Figure 2-7, this soil/peat mixture was placed above the bottom liner system.

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Page 27 (DOE Page 2-16) - Fig. 2-5 site disposal cell primary systems

A-99

- Suggestions:
  a) The angle of the side slope should be indicated on the Figure.

Response: The angle of the side slope is indicated as 4:1.

A-100

b) **The amount of contained radioactivity of "4,000 Curies" differs (understates) the amount of cell radioactivity conveyed in separate letters by former WSSRAP project director Steve McCracken to Kay Drey of 7,044 Curies and to me (same figure 7,044 Curies) by Pamela Thompson, current WSSRAP project director, in a DOE response letter dated <mm/dd/yy>. I find this discrepancy very disquieting as to the accuracy of the data reported in this LTSM plan**. This is an absolutely critical piece of data and raises serious concerns about what data source was used to construct this Figure 2-5, page 2-16 dated "August 8, 2002." [NOTE: I have attached copies of both letters stating that the WSSRAP disposal cell contains 7,044 Curies]

Response A-100: See response to comment A-93.

A-101

c) Note that I have requested from Pamela Thompson via e-mail on August 23, 2002 the data she offered to provide to me how this new calculation was calculated. What bothers me even more is that two citizens—Kay Drey and I—received two official estimates of the cell radioactivity that both stated 7,044 Curies were present. My letter was dated January 2002 months after the cell had been capped. The new figure of 4000 Curies is thus profoundly disturbing and raises the distinct possibility that key site data is being revised. **The reason for performing this new calculation (what prompted it to be done) should be clearly stated in this LTSM plan, and it should be acknowledged in writing that members of the public, on two occasions in 2000 and 2002, had been sent official DOE response letters with total cell radioactivity numbers that later proved to be erroneous (7,044 vs 4,000 total Curies).**

Response A-101: See response to comment A-93.

A-102 d) **The final total amount of Curies should be inscribed on the cell at the observation tablets on the top of the cell.**

Response A-102: Because the calculated curie count of the disposal cell is an estimate, and because the radioactivity is spread widely throughout 1.5 million cubic yards of soil, stabilized sludge and debris, DOE did not believe this information was particularly useful. DOE will further evaluate whether it can or should be permanently recorded on a marker on the cell.

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Page 28 (DOE Page 2-17) - Fig 2-6 disposal cell cover system

- Suggestions:

A-103 a) What does "select soil waste" mean. State the actual waste components or note them to be uncharacterized if this is in fact the case.

Response A-103: The "*Select Soil Waste*" layer referenced by Figure 2-6 differs from the underlying "*Undifferentiated Waste*" solely in terms of geotechnical properties. The 1.5-foot layer of *Select Soil Waste* acts as a subgrade for the Radon/Infiltration Barrier and as a structural buffer preventing protruding waste forms in the immediate vicinity of the radon barrier. The material in question was defined as a silty-clayey soil, with at least 50% passing the #200 sieve and maximum particle size limited to 6-inches. The quantities necessary for the construction of this layer were selectively retrieved from the available contaminated soils present on site, this being the reason of defining them as "*select".*

In contrast to this layer, the geotechnical limitations stated above did not apply to the wastes located more than 1.5-feet below the radon/infiltration barrier, thus the labeling as *Undifferentiated Waste* in Figure 2-6.

A-104 b) Define "undifferentiated waste". Is it undifferentiated or uncharacterized or a complex mixture too difficult/costly to characterize fully?

Response A-104: See response to comment A-103.

A-105 What is the material composition of the "radioinfiltration barrier"?

Response A-105: The Radon/Infiltration barrier was constructed of low permeability natural clays from the pre-qualified Borrow Source. The geotechnical description of the clayey soils used in the construction of this component, as well as the processing, placement and compaction protocols mirrored the requirements and construction methodologies for the Compacted Clay Liner at the bottom of the cell.

A-106 c) The diagram needs to be to scale and to show the dimensions of the various cell components. A photograph should also be included to illustrate undegraded appearance of the materials. The photographs could be in an Appendix. The name

and address of the manufacturer and the part no. and specification of the components should also be given in this document as a guide to future generations.

Response A-106: The diagram would not show the HDPE components of the liner system if drawn to scale – they would present as a single thick line. For this reason, DOE indicated the thickness of the various liner components. DOE will add to Figures 2-6 and 2-7, "not to scale." Equipment specifics are not relevant to the LTS plan.

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Page 29 (DOE Page 2-18) - Fig. 2-7 Disposal cell basal liner system

A-107 • Suggestions:

a) Identify the composition of the "starter dike."

Response A-107: The starter dike represents the lower portion of the Clean Fill Dikes constructed simultaneously with, and as integral part of the cell basal system. Since the top of the starter dikes reflects the outer perimeter limit of the waste, all the layers required on the cell bottom are also present along the interior slope of these structures. The outer body of the starter dikes was built using the same common fill materials and construction protocols as the rest of the Clean Fill Dike System.

A-108 b) The diagram needs to be to scale and to show the dimensions of the various cell components. A photograph should also be included to illustrate undegraded appearance of the materials. The photographs could be in an Appendix. The name and address of the manufacturer and the part no. and specification of the components should also be given in this document as a guide to future generations.

Response A-108: See response to comment A-106.

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Page 30 (DOE Page 2-19)

2.3.2 Disposal Cell (cont'd)

A-109 • Suggestions:

a) In paragraph 3 it is not made clear (a) where the alluded monitoring instruments are located, or (b) who will monitor them. Can this be done remotely (via the Internet or cable access, for example) or will it continue to be on-site? What level of personnel will be responsible for doing the monitoring? How will that person alert their supervisors if there is a problem? These details need to be included to make this a working protocol.

Response A-109: (a) Section 2.3.2, paragraph 8, sentence 1. DOE will revise this sentence to read, "Instrumentation sensors installed in the (LCRS) sump will be used…" (b) Section 3.6.3, paragraph 2, sentence 1. DOE will revise this sentence to read, "DOE will monitor leachate levels and flow rates using manual and automated methods." Presently, monitoring will be done on-site. DOE is currently developing an operating manual for the LCRS and will attach it to this plan as Appendix H. DOE will reference the

operating manual in Section 3.6.3; the manual will include a qualifications requirement for operators.

A-110 The text indicates "The monitoring system has the capability to be modified to provide remote signaling of alarm conditions..." (my underline for emphasis) but how will signaling be accomplished before the remote modification are installed? What is the target date for installing the remote modifications? One again wonders whether this passage was reviewed by the current on-site WSSRAP team. It seems my questions might also have occurred to them and have been incorporated into the draft LTSM plan document.

Response A-110: Monitoring data will be read directly from instruments in the Train 3 building. DOE will revise the LTS Plan to change the name of this structure to the 'leachate treatment building' to correspond with the label on Figure 2-18. Given the frequent monitoring (please see Section 3.6.3, paragraph 4, sentence 1, "Leachate level and flow rates will be monitored daily at the outset."), sump capacity (11,200 gallons), leachate production rate (300 gallons per day) and secondary containment for the sump, DOE does not intend to install a remote alarm capability at this time.

A-111 b) The meaning of the term "headward erosion" as a function of the cell apron should be explained.

Response A-111: DOE will revise this sentence to read, "…from gullying or erosion progressing upslope ("headward erosion") toward the cell."

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A-112 **Page 31** (DOE Page 2-20)
2.3.3 Quarry
- Suggestions:
  a) Define "most contaminated material was removed" in specific terms of what residual contamination remains there. The removed materials should be cataloged in the Detailed Cell Inventory APPENDIX.

Response A-112: Residual contamination remains within the Quarry at several locations. Because levels do not pose a hazard to human health and the environment, it is not necessary to indicate specific locations within the LTS Plan. Institutional controls will be developed for the Quarry area to prevent land uses inconsistent with recreational use.

A-113 Show on a remediated Quarry site map where the residual contamination sites are located. Especially where are they located in relation to the re-routed Katy Trail which is slated to pass directly through the Quarry site.

Response A-113: See response to comment A-112. The Katy Trail has not been re-routed. The new Hamburg Trail connects with the Katy Trail, passes through the western end of the Quarry, and eventually ends in August A. Busch Memorial Conservation Area.

A-114 b) Why aren't the Quarry Institutional Controls in place now? (APPENDIX B is empty)

Response A-114: See response to comment A-5.

A-115 c) When Institutional Controls in section 2-6 are mentioned, the Page number (2-41 doc. no., sequential page 51) should be stated to make it easier to find this key section.

Response A-115: DOE does not intend to add the page number to the reference to Section 2.6 that appears on page 2-20 of the LTS Plan. These types of references make document maintenance more difficult.

A-116 I do note the entire description of ICs is less than one page long and that the statement that "locations are shown in B-1 and B-2..." is inaccurate because the entire Appendix B has no current content. Instead of "are shown" the text should read "will be shown in later drafts." My question is, will the public see all of the future drafts and be allowed to comment upon them. I certainly hope this will be true.

Response A-116: DOE has shown the areas that require ICs on Figures B-1 and B-2 and does not intend to revise the text as suggested. The public and stakeholders may provide input to the content of ICs in the working sessions scheduled for the last quarter of calendar year 2002. However, to expedite execution of these agreements, DOE will not offer individual IC instruments for public comment.

A-117 Despite GJO's statements in their recent phone call to me (August 19, 2002) this section contains zero details of what will actually be done with respect to site Institutional Controls. This is entirely unacceptable for a third-fourth generation document that has been in progress for over two years with a closure date announced months ago. The pace of creating definitive IC protocols and sending them through a regulatory, legal and public commentary review process will have to be vastly accelerated. I see little progress evident between last September and this report issued a full ten months later.

Response A-117: Comment noted.

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A-118 **Page 32** (DOE Page 2-21)

• Suggestions: Figure 2-8 should be resized to fill the entire printable space. The smallest text legends are practically unreadable.

Response A-118: Agree. DOE intends to also expand Figures 2-18, 2-19, B-1, and B-2 to improve readability.

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A-119 **NOTE THERE IS NO PAGE 2-22 - will be 32b if it becomes available in the future**

Response A-119: Page 2-22 is the back of page 2-21. See also response to comment A-147.

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Page 33 (DOE Page 2-23) ==> not yet reviewed dwm 8-21-2002

2.4.1.2 Quarry Residuals Operable Unit

- Suggestions: No changes.

2.4.2 Ground Water Standards

- Suggestions: No changes.

==========

Page 34 (DOE Page 2-24) ==> not yet reviewed dwm 8-21-2002

Table 2-4

2.4.3 Ground Water Quality

2.4.3.1 Ground Water Operable Unit

- Suggestions: No changes.

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Page 35 (DOE Page 2-25)

Figure 2-9. Extent of Uranium Contamination in Ground Water at the Chemical Plant Area.

A-120

- Suggestions: This crucial **map, the one I am personally the most interested in the entire document, has many illegible legends** even when the web downloaded version is printed on a 1200 dpi H-P 4050N laser printer. A larger more legible version of this Figure must be provided as a foldout, on CD-ROM, as a high resolution downloadable file (least desirable because of long download times). There is room on the page to expand the map portion -- only a 1/2 inch white space border is really necessary. Current borders are 1.5 inches top and left margin, 1 and 3/8th inch right margin, and two inches from the lower box border to page bottom. Even this amount of map enlargement would greatly improve map readability. Please do this! **THE URANIUM EXTENT LINES, LOCATIONS AND AMOUNTS ARE NOT EVIDENT ON THE DIAGRAM** -- are they there?

Response A-120: DOE will enlarge Figures 2-9, 2-10, 2-11, 2-12, and 2-13 to improve readability. For the draft LTS Plan, DOE changed the color of the uranium extent lines to a darker hue so the map will print and copy in black and white. DOE will darken the lines more, if necessary, to ensure legibility. DOE will also try to increase the text size.

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Page 36 (DOE Page 2-26)

Figure 2-10. Extent of TCE Contamination in Ground Water at the Chemical Plant Area.

A-121

- Suggestions: Exactly the same **illegibility** comments apply here as to page 2-25 Fig 2-9 and the suggested remedy is the same -- increase map size, decrease border.

Response A-121: See response to Comment A-120.

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Page 37 (DOE Page 2-27)

A-122 ***Figure 2-11. Extent of Nitrate Contamination in Ground Water at the Chemical Plant Area***.

• Suggestions: Exactly the same **illegibility** comments apply here as to page 2-25 Fig 2-9 and Fig. 2-10 and the suggested remedy is the same -- increase map size, decrease border white space.

Response A-122: See response to comment A-120.

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A-123 **Page 38** (DOE Page 2-28)

Figure 2-10. Extent of 2,4-DNT Contamination in Ground Water at the Chemical Plant Area.

• Suggestions: Exactly the same **illegibility** comments apply here as to page 2-25 through 2-27 Figs 2-9 through 2-11 and the suggested remedy is the same -- increase map size, decrease border.

Response A-123: See response to comment A-120.

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A-124 **Page 39** (DOE Page 2-29)

Figure 2-13. Ground Water Monitor Well Locations ...

• Suggestions: Exactly the same **illegibility** comments apply here as to page 2-25 through 2-28 Figs 2-9 through 2-12 and the suggested remedy is the same -- increase map size, decrease border.

Response A-124: See response to comment A-120.

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A-125 **Page 40** (DOE Page 2-30)

Table 2-5. Summary of 2001 GW Analytical Results at Chemical Plant

• Suggestions: **I take strong exception to the statement in the first paragraph that "upgradient-downgradient water quality comparisons are not applicable." "Site-specific background levels will be used."** This is a huge technical issue. Jeffrey Imes of USGS-Rolla supports my position that what would be desirable is uranium data up and down the Missouri River alluvial floodplain away from Superfund sites. Off-site background uranium levels would undoubtedly be much lower than those measured on-site and at Darst Bottoms at Weldon Spring which give a false impression by blunting the difference between "background" (relatively high due to contamination from groundwater) and uranium and radioactivity levels in the St. Charles county well field pumping wells that provide drinking water to the public.

Response A-125: Upgradient and downgradient water quality comparisons are not applicable to the chemical plant groundwater, which is not associated with the groundwater system at the quarry. The chemical plant is located on the regional groundwater divide; therefore there are no true upgradient locations that may not have been impacted by historical source areas. It was necessary to use existing wells, located on the neighboring ordnance works property, to estimate background levels of naturally occurring constituents (i.e., metals and anions). Organic compounds are anthropogenic, and any detected

concentrations of these were assumed to be site related. The background monitoring wells for the remedial investigation were selected on the basis of (1) completion in similar hydrostratigraphic units; (2) location outside of areas directly affected by contamination from the chemical plant area; and (3) location upgradient or at a distance from TNT-DNT production areas. A full discussion of the selection of the wells is presented in the *Remedial Investigation for the Groundwater Operable Units for the Chemical Plant and Ordnance Works Areas*.

Due to the different aquifer media, background values were established for the alluvium and bedrock (Kimmswick-Decorah and Plattin Groups). Background for the alluvium (average of 2.77 pCi/l) was developed using data developed by the USGS (USGS Report 93-109). During 1991, the USGS began a study to determine the background water quality concentrations for selected chemical and radiochemical constituents in the nearby Missouri River and the Missouri River alluvium near the quarry. The Darst Bottoms area, which is located upgradient of the Weldon Spring quarry, was selected as an appropriate location to establish background concentrations. The study indicated that uranium concentrations were largest in the two monitoring well clusters closest to the river (maximum = 14.3 pCi/l). Dissolved uranium concentrations typically were larger in the Missouri River (maximum = 5.1 pCi/l and average = 3.5 pCi/l); however the variability of uranium concentrations in the alluvium was larger than in the river samples.

A-126 **I claim these pumping well radioactivity levels are higher than true off-site uranium levels would be at non-Superfund locations**. That is the important point from a public health and safety point of view. If my suggested background levels were employed them well field levels would appear relatively and absolutely higher than the numbers DOE and MDNR report. This would more accurately reflect the fact that uranium levels are increased in the well field as a result of Quarry and Chemical Plant contamination. Yet even when one uses 0.93 pCi/L uranium as background, in 2001 38 of 68 wells exceeded this value (Page 2-30 doc. no.). So by any standard, uranium levels are elevated and literature exists showing chronic exposure of humans to these low but elevated levels can cause kidney diseases including nephritis (inflammation that can require dialysis treatment) and kidney cancers. Both types of pathology were increased in 2,541 white male former Mallinckrodt Chemical Uranium Division workers from the downtown and Weldon Spring sites as published by E. Dupree-Ellis et al., Amer J Epidemiol, July 2001 issue. I have discussed these results in a phone with Dr. Dupree-Ellis a few months ago.

Response A-126: The background levels used by the DOE reflect natural uranium concentrations in the Missouri River alluvium (average of 2.77 pCi/l). These values were determined from an area that could not be affected by impacted groundwater migrating from the quarry. It is physically impossible for groundwater from the quarry to migrate against the gradient in the river alluvium. During 1986, a groundwater model of the St. Charles county well field indicated that two-thirds of the water pumped from the well field comes directly from infiltration from the Missouri River and as production increases, the percent contribution from the river increases (Layne-Western Company, 1986). Since the average dissolved uranium concentration in the Missouri River averages 3.5 pCi/l (USGS

Report # 93-1069), it would be likely that levels similar to this would be observed in water from the production wells.

The background value for uranium in the weathered Burlington-Keokuk Limestone at the Chemical Plant is 0.93 pCi/l. Based on the monitoring approach used at the Chemical Plant, it is not surprising that 38 of 68 monitoring wells exceeded the background value. Groundwater monitoring is typically performed in areas where impact is likely to occur (i.e., near source areas). DOE will revise the LTS plan to clearly indicate the respective background concentrations for these two separate and unrelated groundwater systems.

A-127 **Note also the massive uranium contamination of Quarry groundwater in 2001 averaging 326 pCi/L (standard 20 pCi/L) on doc. no. Page 2-32 Table 2-8**. Once again it is very troubling that Katy Trail is planned to be rerouted through the quarry remediated area. Knowing the geographic proximity of the new trail route and the groundwater contamination sites at the Quarry will be essential to design Institutional Controls that will fully protect the public health and safety.

Response A-127: Again, it is not surprising that the average uranium concentration is high, given the majority of the wells are in the known area of impact. These wells were installed to delineate uranium impact and monitor changes in concentrations during and after remedial actions.

The Katy Trail, a MNDR State Park, is not being rerouted through the quarry. Institutional controls, are being designed to be protective of public health and safety.

A-128 We know off-site radioactive and nitroaromatic contamination can happen because of the chronically elevated uranium and nitrates in Burgermeister Spring 6301 in the Busch Conservation Area and TNT elevations that caused wells at Twin Lakes campground, far off-site, to be shut down a decade ago. We also know from historical records that WSOW massively contaminated Dardenne Creek with explosives residues in the early days of operation, and we can infer the Chemical Plant contaminated the MO River with chemicals and radioactivity in its early days of operation (1957-66). This latter fact is (apparently) not so well documented by historical records that, most unfortunately, were either not created or have been lost or destroyed over time.

Response A-128: DOE has acknowledged the impact at Burgermeister Spring. Source removal activities at the chemical plant have resulted in a downward trend in uranium and nitrate levels in this spring. Presently the levels in the spring average near the groundwater standards for these constituents.

Potable water was provided to the campground by the Department of the Army due to nitroaromatic compound contamination in the campground's wells.

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Table 2-6
Table 2-7
• Suggestions: No changes.
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Page 42 (DOE Page 2-32)
Table 2-8. Summary of 2001 Ground Water Analytical Results at the Quarry
• Suggestions:

A-129 a) **Note the massive uranium contamination of Quarry groundwater in 2001 averaging 326 pCi/L (standard 20 pCi/L) on doc. no. Page 2-32 Table 2-8**. Once again it is very troubling that Katy Trail is planned to be rerouted through the quarry remediated area. Knowing the geographic proximity of the new trail route and the groundwater contamination sites at the Quarry will be essential to design Institutional Controls that will fully protect the public health and safety. [from page 40 comments]

Response A-129: See response to comment A-127.

A-130 b) The important statement that **"no locations south of the Femme Osage Slough had uranium levels that exceeded background"** should be presented with individual well data as a separate Table. Alternately, the statement should be expanded to state the number of wells tested and their locations and sampling intervals.

Response A-130: The discussion of data is a summary presentation of the groundwater conditions as they presently exist. Detailed data discussions, including presentation of individual well data, are included in the Annual Site Environmental Reports.

A-131 Was this the same as for the wells North of FOS? If it is true that uranium north of FOS **"has no measurable impact on drinking water source in the Missouri River alluvium"**, then how does DOE explain periodic exceedances and non-zero, higher than background levels of uranium, gross alpha and gross beta in the well fields PW-x wells as recorded in the DOE "pumpingwells 1991" dataset which DOE provided to me via Mary Halliday at St. Charles county Environmental Services in June 2001? The statement above and the pumpingwells data seem to be in conflict. **The data that supports the bolded statements above should be presented for all to see and consider**. This is a crucial baseline stewardship issue and the public needs to be able to see the real data, not just be asked to accept a one or two sentence unsupported statement.

Response A-131: The statement that "no locations south of the Femme Osage slough had uranium levels that exceeded background" is supported by data collected since 1986. A total of 980 samples from the monitoring wells, RMW-series wells, and the production wells have been analyzed for total uranium. Of these, 90% have been below the average background value of 2.77 pCi/l and none of the samples have been outside the maximum background range for uranium (14.3 pCi/l) observed in the Darst Bottoms wells. These

data support the conclusion that uranium contamination north of the slough has had no measurable impact on the production wells south of the slough.

The 1991 production well data indicates that the total uranium and gross beta data was within background ranges. Two of the production wells had elevated gross alpha values for the fourth quarter. As discussed in the *Weldon Spring Site Environmental Report of Calendar Year 1991* (Rev. 1), the fourth quarter results were erroneously high due to laboratory interferences and were rejected based upon data validation. Data are validated to review analytical documentation and to determine the validity of any subject data point or data group. Subsequent samples have not indicated similar levels and therefore, these values are considered suspect.

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Page 43 (DOE Page 2-33)

A-132 ***Fig 2-14. GW monitor well locations***

- Suggestions: **Illegible** legends, enlarge the map!

Response A-132: See response to comment A-120.

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Page 44 (DOE Page 2-34)

A-133 ***Fig. 2-15. Extent of uranium contamination in GW at the Quarry Area***

- Suggestions: **Illegible** legends, enlarge the map!

Response A-133: See response to comment A-120.

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Page 45 (DOE Page 2-35) ==> not yet fully reviewed dwm 8-21-2002

2.4.4 Baseline Water Quality for Disposal Cell Detection Monitoring

2.5 Surface Water Conditions

A-134
- Suggestions
  a) Which "off-site bodies of water did DOE monitor for uranium" and when and what were the results?

Response A-134: The surface water locations routinely monitored, along with the 2001 results, are presented in Section 2.5.2, Surface Water Quality, of this LTS Plan. Figures 2-16 and 2-17 identify each location. In addition, surface water results have been presented annually in the Weldon Spring Site Environmental Reports since 1986. (ML)

2.5.1 Surface Water Standards

- Suggestions: No changes.

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Page 46 (DOE Page 2-36) ==> not yet fully reviewed dwm 8-21-2002

Table 2-9. Baseline Values for Disposal Cell Monitoring Locations

A-135
- Suggestions: The SP-6301 Burgermeister spring uranium value of 204 pCi/L seems much higher than for other 2001 data I have seen on this spring. I have requested a copy of

REF DOE 2002d. Where does the 204 pCi/L number represent - is it a peak reading, an average, over what time interval. Here again when one needs to review this document it is defeating to be referred to another non-available (or not immediately available) report that is required to understand Table 2-9.

Response A-135: The uranium concentration presented in Table 2-9 for Burgermeister Spring represents the UCL 95 for data collected in 1997. During 1997, prior to waste placement, the disposal cell monitoring wells and Burgermeister Spring were sampled quarterly to establish baseline water quality conditions. Baseline conditions for each location were determined by generating an upper bound value for each parameter based on a 95% tolerance interval calculated for each data set. This information is presented in Section 2.4.4 and mirrors the information presented in reference 2002d. This baseline concentration is indeed higher than what you have seen recently since uranium concentrations at Burgermeister Spring have been declining over the past few years.

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Page 47 (DOE Page 2-37) ==> not yet fully reviewed dwm 8-21-2002

2.5.2.1 Chemical Plant Operable Unit

Table 2-10, 2001 surface water uranium averages Chemical Plant

A-136 • Suggestions: The historical high for uranium of 326 pCi/L in 1991 in Busch Lake 35 and lower but elevated uranium elevations in Busch Lakes 4 and 36 differs from a former DOE response I received asking about this specific contamination. I was told the only radioactive contamination of these three specific lakes was a few cubic yards of sediment that DOE disposed of even though it was not required to. These values are way above background and are all above EPA uranium 20 pCi/L limits. So a more accurate and truthful answer to my question is , yes, all 3 lakes were contaminated and have/have not been remediated. **Note the uranium averages for all three lakes are elevated well above 0.93 pCi/L background**. This repeated slanting of the true facts is deeply disturbing to me and creates a strong sense of doubt in accepting any DOE site data at face value. This is a sad thing to have to say, but it is true and is the way I feel today as I struggle with this document at 2:12 a.m.

Response A-136: While Busch Lakes 34, 35, and 36 contain above background uranium concentrations in the sediment, the characterization results were also all below the cleanup criteria presented in the Chemical Plant Record of Decision. These criteria were used to determine the off-site areas that require remediation. Although the characterization results indicated that removal of sediment was not required, the DOE agreed to remove sediments within an area approximately 150 ft by 65 ft at the request of the State of Missouri. This was possible since the Missouri Department of Conservation had drained Busch Lake 36 for scheduled restoration. As far as surface water concentrations are concerned, the 20 pCi/l and 0.93 pCi/l references in the comment are appropriate for groundwater comparisons but not surface water as discussed in this section. Surface water background presented in this LTS Plan is identified in Table 2-10, which gives a range of 0.1 to 8.2 pCi/l. The 2001 concentrations reported for all Chemical Plant Area surface water locations, also identified in Table 2-10, are within the range of background.

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Page 48 (DOE Page 2-38)

Fig 2-16. Surface Water Monitoring Locations Chemical Plant Area

A-137 • Suggestions: This is a clear and legible diagram. What puzzles me is I have rarely seen any actual data from these surface water monitoring sites. Are the sites represented by monitor well numbers? If so, the well numbers should be stated in the text or added to the diagram (as a separate one please so as not to make this one unreadable). I notice NPDES Outfall 007 is located—where are Outfalls 001-006?

Response A-137: This figure identifies the surface water and NPDES locations discussed in this LTS Plan. Any locations not identified, such as Outfalls 001 through 006, are not expected to be monitored during long term stewardship. While this LTS Plan presents 2001 data, the data from surface water sampling locations has been presented annually in Weldon Spring Site Environmental Reports since 1986.

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Page 49 (DOE Page 2-39)

2.5.2.2 Quarry residuals Operable Unit

• Suggestions: No changes.

Table 2-11. 2001 Annual Averages for Total Uranium Conc. at Quarry Area Surface Water Locations

• Suggestions:

A-138 a) That FOS levels "remain within Historical levels" should give no comfort since the average levels in SW-1103 through SW-1010 are 7-17 fold higher than background of 0.93 pCi/L. The point is the surface water where people routinely fish and then eat the fish (there are no signs not to do so) is chronically elevated, just the conditions published studies have shown causes the kidney disorders nephritis and cancer (see book by Fajardo, Berthrong and Anderson, "Radiation Pathology" Oxford Univ. Press, 2002, pp 271-288). Institutional Controls are required by CERCLA to protect the public from this bad practice. ICs should have been instituted decades ago when the extent of contamination was much worse and hence fishermans exposures were even higher. I wonder how many of these people suffered renal damage from this oversight and lack of responsible historical stewardship. **Fishing should not be allowed in FOS now and never should have been in the first place**.

Response A-138: The intent of the discussion was to show that uranium concentrations have been decreasing. The commentor is correct in pointing out that these concentrations are elevated as compared to background. However, these data have been incorporated into the baseline risk assessment conducted for the Quarry Residuals Operable Unit; and the risk results indicate that potential risk to a recreational visitor to the Femme Osage Slough is within the EPA's acceptable risk range. Hence, conditions were considered protective and restriction of activities associated with recreational land use was not needed.

The calculations accounted for the ingestion of surface water, sediment and fish. Details of the risk evaluation are presented in the report entitled "Baseline Risk Assessment for the Quarry Residuals Operable Unit for the Weldon Spring Site, Weldon Spring, Missouri", dated February 1998. Surface water data were used in addition to those collected from sediment and fish samples for calculating the potential risk to a recreational visitor to the Femme Osage Slough. The recreational visitor scenario was considered to be representative of current and foreseeable land use (including recreational fishing). Finally, the reference dose provided by the EPA for calculating potential chemical toxicity or hazard from uranium incorporates kidney toxicity; and the slope factor used in estimating radiological risk incorporates the potential for cancer from uranium. This approach is consistent with the findings of the publication cited by the commentor.

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Page 50 (DOE Page 2-40)

Fig. 2-17. Surface Watering Monitoring Locations - Quarry Area

A-139 • Suggestions: Point of clarification: The monitor well symbols are placed on the slough line. Are they under water or are they on the north or south banks?

Response A-139: In Figure 2-17, the symbols depict surface water (SW) sampling locations along the northern bank.

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Page 51 (DOE Page 2-41)

2.6 Institutional Controls

A-140 • Suggestions: I do note the entire description of ICs is less than one page long and that the statement that "locations are shown in B-1 and B-2..." is inaccurate because the entire Appendix B has no current content. Instead of "are shown" the text should read "will be shown in later drafts." My question is, will the public see all of the future drafts and be allowed to comment upon them. I certainly hope this will be true. Despite GJO's statements in their recent phone call to me (August 19, 2002) this section contains zero details of what will actually be done with respect to site Institutional Controls. This is entirely unacceptable for a third-fourth generation document that has been in progress for over two years with a closure date announced months ago. The pace of creating definitive IC protocols and sending them through a regulatory, legal and public commentary review process will have to be vastly accelerated. I see little progress evident between last September and this report issued a full ten months later.

Response A-140: DOE has shown the areas that require ICs on Figures B-1 and B-2 and does not intend to revise the text as suggested. The public and stakeholders may provide input to the content of ICs in the working sessions scheduled for the last quarter of calendar year 2002. However, to expedite execution of these agreements, DOE will not offer individual IC instruments for public comment. Please see also the response to Comment A-5 regarding development of ICs.

2.7 Site Drawings and Photographs

A-141 • Suggestions: [Comment: *The protocol for making site drawings, including the disposal cell grid and contents map/s, and photographs, needs to be spelled out here in detail*]

Response A-141: DOE does not intend to add protocols in the LTS Plan. DOE must adhere to records requirements, which define acceptable records media.

A-142 a) It is completely unacceptable to state these vital "as-built drawings and maps ... are included in Weldon Spring site records." This is a key point of contention that requires a detailed protocol on exactly how and where and what documents are to be physically kept at Weldon Spring site. Pamela Thompson told me in response to a question that no photographs are stored on-site but that "tens of thousands" are kept at headquarters. I said where is that, Oak Ridge and In understood her to say yes. This information is then in direct conflict with the LTSM plan statement quoted above. Furthermore I have been informed that not all Admin Record documents will be physically stored on-site.

Response A-142: DOE will revise the text to indicate that as-built drawings will be maintained in the permanent site record in Grand Junction, Colorado. Records necessary for ongoing stewardship of the Weldon Spring site will be located in Grand Junction. Documents to be maintained at the Weldon Spring site will include stewardship documents for the use of on-site stewards, site information for use by the public and a copy of the CERCLA Administrative Record.

A-143 b) Is there/will there be an electronically accessible index of photographs kept at the Interpretive Center as part of the WSSRAP Administrative Record?

Response A-143: DOE does not intend to provide an electronic index of photographs. Photographs are not part of the administrative record. DOE will provide site inspection photographs on the LTSM Program Internet site.

A-144 c) In regard to (b), the U.S. Army has not stated where their site photographs or Administrative Record pertaining to the WSOW remediation portion of the Superfund cleanup at Weldon Spring will be stored. Will these complementary records be kept at the Interpretive Center? Will they be maintained at the St. Charles county library system and, if so, which branch/es and what specific documents will be archived? Will there be an electronic access method?

Response A-144: DOE does not have an agreement with the Army to maintain their records.

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Page 52 (DOE Page 2-42)
Table 2-12. Summary of Institutional Controls for the Weldon Spring, Missouri, Site

A-145 • Suggestions: These allusions to potential ICs as "not yet implemented", "actual methods have not been identified", and "will not be finalized until GWOU ROD is finalized" actually represent almost nothing done on actually defining and doing the crucial legal and technical work, a huge burden. As it stands right now, even though CERCLA mandates they be in place, no ICs are in place at the Weldon Spring site. This is one area where DOE, EPA and MDNR have clearly not done their jobs or really made a good faith effort to do so.

Response A-145: DOE acknowledges that ICs have not been implemented, as indicated in the LTS Plan. DOE presented this information to indicate the specific occurrences of contaminated material that require ICs. DOE anticipates that ICs will be an important topic of conversation in the upcoming work sessions. See response to comment A-5.

2.7.1 Site Maps

A-146 • Suggestions: Figures 2-18 and 2-19 on the next two pages are crucial but very densely annotated maps that are rendered as such a small size that the legends are illegible on a downloaded laser printed version even with a magnifying glass. DOE-WSSRAP has not responded to my request for a printed copy of the WS LTSM draft plan, but I suspect the answer lies in including larger size folded maps in the final published report. As mentioned in the introductory comments (see #12), CD-ROM and web downloaded (PDF, high resolution digital images) versions are other solutions to this illegibility problem. People must be able to read the maps comfortably in order to be able to fully understand the LTSM plan.

Response A-146: As mentioned previously, DOE will improve the readability of the figures.

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Page 53 (DOE Page 2-42)

• Suggestions: See Page 52 (doc. no.

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Page 54 (DOE Page 2-43)

• Suggestions: No changes.

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A-147 **NOTE THAT PAGES 2-44, 2-45 AND 2-46 WERE NOT INCLUDED WITH THE WEB VERSION OF THE DRAFT PLAN** - these will be numbered 54b, 54c, 54d if they subsequently become available for this document.

Response A-147: Page 2-44 is the blank backside of Figure 2-18. Page 2-45 is Figure 2-19, with page 2-46 the blank backside of this figure. DOE will consider placing a page number on the back of these pages with the legend, "This page intentionally left blank" to ensure readers understand they are not missing a portion of the document.

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Page 55 (DOE Page 2-47)

2.7.1.5 Site maps, photos, aerial photos baseline and inspection (cont'd)

A-148

• Suggestions: It is not clear where the site baseline and inspection maps and photographs will be stored (GJO or on-site at WS Interpretive Center), how they will be accessible to regulators and to the public, how they will be cataloged, and whether there is a current index of the historical and "as-built" maps and photographs. I note that LTSM World Wide Web documentation of other stewardship sites often includes photographs from the inspections. This mechanism could/should also be mentioned if it will also be employed at Weldon Spring site.

Response A-148: Record copies of site information *necessary for long-term stewardship* will be managed in the permanent site record in Grand Junction. Any record material is available to the public or to regulators, subject to privacy constraints. Selected site records will be entered into an online searchable records database that is under development by the LTSM Program in Grand Junction (http://www.gjo.doe.gov/programs/ltsm/). Significant records (including the complete Weldon Spring site administrative record and post-decision documents) will be available as scanned image files. All other WSS records will be submitted to the Kansas City federal records center or the national archives and can be accessed by the public through the GJO office.

At this time there is not an index of historical maps and photographs. As-built maps will be stored in Grand Junction, indexed, and available electronically as scanned images. DOE will post inspection photographs for the Weldon Spring site on the Internet by two methods. Inspection reports, which may include photographs, will be posted. Also, photographs will be linked to photograph locations shown on a geographic information system (GIS), which will also present well locations and information, analytical results, and other physical site features.

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A-149 **Page 56** (DOE Page 2-48)
2.8.2 Site Markers
2.8.3 Monitor Wells
• Suggestions:
a) How will the public get access to these Chemical Plant and Quarry monitor well information (construction details, especially well depth, which I am interested in obtaining now for the Remington and public drinking water wells and those monitor wells south of Femme Osage Slough)? This should be spelled out in this section of the plan. There must be a policy on how the public gets access to DOE-GJO documents.

Response A-149: See response to comment A-12. Please note that volumous requests requiring significant resources and time to fulfill may have to be initiated through a Freedom of Information Act (FOIA) request.

A-150 b) The plan to keep important records at GJO seems to be different from Pam Thompson's oft-stated assurances that key WSSRAP records will be on-site in the Interpretive Center at Weldon Spring. Please clarify this point for everyone—what records will be kept where?

Response A-150: See response to comments A-15, A-142, and A-148.

Page 57 (DOE Page 3-1)

3.0 Long-Term Stewardship Program
3.1 Stewardship Overview
3.2 Routine Site Inspections
3.2.1 Frequency of Inspections

- Suggestions:

A-151

a) What is the inspection timetable for years 1-3 (FY 2003 - 2005) since no ICs are currently in force and a timetable for having them in place has not been provided? What date is the first scheduled inspection?

Response A-151: DOE will conduct annual inspections of the portions of the Weldon Spring site for which remedial action is complete. The initial annual site inspection will be conducted in spring or early summer 2003; the specific date has not been set.

A-152

b) What is the protocol for the terrestrial and aerial surveys and inspection procedures (provide specifics which should be available from other LTSM sites).

Response A-152: DOE is currently developing specific procedures for conducting 5-year surveys of the disposal cell. These will be included in the next revision of the LTS Plan. Inspection procedures are discussed in Section 3.2 of the LTS Plan. DOE intends to add a public availability session at the Interpretive Center in conjunction with annual inspections; the LTS Plan will be revised to specify notification of this event.

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Page 58 (DOE Page 3-2) ==> not completely reviewed 8-21-02

Table 3.1 Summary of Stewardship Objectives and Strategies for WS MO Site
Table 3.2 Long-Term Stewardship Elements for WS MO Site

- Suggestions: No changes.

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--Stop point for review prior to Aug 22, 2002 WSCC meeting at Interpretive Center--

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Page 59 (DOE Page 2-12)

- Suggestions: No changes.

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Page 60 (DOE Page 2-12)

- Suggestions: No changes.

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Page 61 (DOE Page 2-12)

- Suggestions: No changes.

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Page 62 (DOE Page 2-12)

- Suggestions: No changes.

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Page 63 (DOE Page 2-12)
• Suggestions: No changes.
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Page 64 (DOE Page 2-12)
• Suggestions: No changes.
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Page 65 (DOE Page 2-12)
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Page 66 (DOE Page 2-12)
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Page 67 (DOE Page 2-12)
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Page 68 (DOE Page 2-12)
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Page 69 (DOE Page 2-12)
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- Suggestions: No changes.

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Page 81 (DOE Page 2-12)
- Suggestions: No changes.

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Page 82 (DOE Page 2-12)
- Suggestions: No changes.

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Page 83 (DOE Page 2-12)
- Suggestions: No changes.

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Page 84 (DOE Page 2-12)
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- Suggestions: No changes.

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Page 123 (DOE Page 2-12)

- Suggestions: No changes.

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Page 124 (DOE Page 2-12)

- Suggestions: No changes.

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Page 125 (DOE Page 2-12)

- Suggestions: No changes.

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Page 126 (DOE Page 2-12)

- Suggestions: No changes.

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A Critique of the August 9th Weldon Spring Site Stewardship Plan: "Long Term Surveillance and Maintenance Program Long-Term Stewardship Plan for the Weldon Spring, Missouri, Site" August 9, 2002 (GJO-2002-342-TAC; GJO-LWEL 1.1-1)

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Analysis 8/20-22/2002

This critique was written from a copy downloaded from the web. The URL was supplied in an announcement of document availability letter DWM received August 10, 2002. A written copy was requested by letter 8/16/02. Not received as of 8/20/02.

This comments narrative was based on the web version.

On 8/06/02, 8/16/02 and 8/23/02 Dan McKeel requested in writing and via e-mail to be mailed copies of the Aug. 9, 2002 LTSM draft plan. A copy was finally received on Monday, August 26, 2002 just two days prior to the 8/28 public workshop. **The bound copy contained many different, larger and more eligible maps and figures than were available on the web version**. I must register a strong complaint that the public wasn't provided a hard copy on the release date of August 9th, 2002.

Part II of the critique, pages 57-126 follows...
filename: steward2_pt2_critique.pp57_126

Page 57 (DOE Page 3-1)
3.0 Long-Term Stewardship Program
3.1 Stewardship Overview
3.2 Routine Site Inspections
3.2.1 Frequency of Inspections

- Suggestions:

A-153 a) What is the inspection timetable for years 1-3 (FY 2003 - 2005) since no ICs are currently in force and a timetable for having them in place has not been provided? What date is the first scheduled inspection?

Response A-153: See response to comment A-151.

A-154 b) What is the protocol for the terrestrial and aerial surveys and inspection procedures (provide specifics which should be available from other LTSM sites).

Response A-154: See response to comment A-152.

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Page 58 (DOE Page 3-2) ==> not completely reviewed 8-21-02
Table 3.1 Summary of Stewardship Objectives and Strategies for WS MO Site
Table 3.2 Long-Term Stewardship Elements for WS MO Site

- Suggestions: No changes.

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--Stop point for review prior to Aug 22, 2002 WSCC meeting at Interpretive Center--

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Page 59 (DOE Page 3-3)
Table 3-3. Inspection Areas of the Weldon Spring Site, MO

- Suggestions:

A-155 a) Chemical Plant Outlying Area. **Add Spring 6306 north of highway 40/64 to the monitored spring list**. This Spring has historical elevations of uranium up until 1995 and a single elevation to 23.6 pCi/L in 2001 (Jan. 18 MDNR sample). It is located in a residential area (O'Fallon MO) and has been heavily monitored historically as a key vicinity area spring. It is fed by 6301 and lake 34. Nearby residents focused on this spring 6306 as a possible factor in a small cluster of infant deaths that was the subject of an October 2001 MO Dept. of Health infant mortality and case study epidemiologic report issued by Ed Simoes, chief Epidemiologist of Missouri. A high level of citizen concern remains in this area. A petition has been signed by almost 200 St. Charles countians urging DOE and MDNR to continue monitoring this spring.

Response A-155: The comment to continue monitoring Spring 6306 is accepted. This spring location will not be included in Table 3-3 which lists only those areas which require inspection due to use restrictions.

A-156 b) How, specifically, will "inspectors ensure that institutional controls remain effective?"

Response A-156: Section 3.2.2, paragraph 2, sentence 3.. DOE will revise this sentence to read, "Inspectors also will look for evidence of intrusion and violation of institutional controls."

A-157 c) How can the public be assured of anything pertaining to ICs when none have been put in place? Hence, it is impossible to assess the adequacy of IC inspection proposals, a true Catch-22 situation caused by the severe delay by DOE in instituting ICs.

Response A-157: Comment noted.

A-158 d) Since it is (unwisely and irresponsibly) being proposed that Katy Trail will be rerouted through the Quarry, inspection of this area should receive primary attention for damage due to hikers, bikers and ATVs that are likely to "give it a try."

Response A-158: Realignment of the Katy Trail was never proposed.

A-159 e) What "site markers" are being referred to, specifically? Does this refer to signs that will be installed as part of IC implementation?

Response A-159: Site markers are described in Section 2.8.2. This statement does not refer to signs.

A-160 f) The statement "it may be useful to document some types of observations with photographs" is vague, non-committal and unenforceable as an action guideline. Rather, DOE-GJO should mandate that comprehensive photographs should be [1] taken of every part of the site, [2] should be made available to the public in its inspection reports if for no other reason than to document the team did its job and the site needs no further work based on this photographic evidence that nothing has significantly deteriorated based on visual inspection (a pretty "soft" engineering test).

Response A-160: When DOE began inspecting LTS sites in 1989, inspectors collected a comprehensive set of photographs annually. DOE determined that this approach did not add value and was not a good use of resources; and therefore modified the direction to inspectors to use discretion in identifying features to be photographed. DOE will photodocument final site conditions for the permanent site record, which will serve as a baseline for comparison of subsequent observations. Baseline photographs will be available on the Internet.

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Page 60 (DOE Page 3-4)

3.2.3 Inspection Checklist and Map

- Suggestions: No changes.

3.2.4 Personnel

- Suggestions: No changes.

3.2.5 Annual reports

• Suggestions: No changes.

3.3 Follow-up Inspections

• Suggestions: No changes.

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Page 61 (DOE Page 3-5)

3.3.1 Criteria

• Suggestions: No changes.

3.3.2 Personnel

• Suggestions: No changes.

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Page 62 (DOE Page 3-6)

3.3.3 Reports of Follow-up inspections

A-161 • Suggestions: The specific types of triggering "serious or emergency events" should be further specified in order to provide more specific guidance to persons who are charged with carrying out and monitoring the effectiveness of this plan (such as MDNR, WSCC).

Response A-161: DOE will revise the text.

3.4 5-Year Review

A-162 • Suggestions: The detail in this key section is totally lacking and therefore is inadequate. Has the mentioned 5-Year Review of 2001 been published? It should be referenced. I am not aware the availability of this document has been transmitted to the public. If so, I have not learned or been informed about it through DOE, MDNR or WSCC. The latter entity is specifically charged with relaying this type of vital information to the general public.

Response A-162: The 5-year Review for 2001 has been finalized and will be referenced.

3.5 Routine Site Maintenance and Operations

A-163 • **Suggestions:**

a) **Road and Walkways**—I find it surprising that "MDOC is responsible for maintenance of the Hamburg Trail." Is this agreement currently in place? It should be included in this document. I find the arrangement curious since hamburg Trail is a spur trail off of Katy Trail in the State Park that is under the jurisdiction of MDNR. This particular interagency relationship should be clear set forth in this plan.

Response A-163: This agreement is not currently in place. DOE will include this agreement in the LTS Plan.

A-164 b) **Wells**—what "access agreements" are in place now? These should be cited and placed in this document as an "Access Agreements" Appendix.

Response A-164: DOE requires access to wells on MDOC property, DOD Army property and within the MDNR Division of Parks KATY Trail right-of-way. These agreements will be included in the next version of the LTSP.

A-165

c) **Leachate Collection and Removal System**—Leachate concentration of contaminants such as uranium, nitrates, and heavy metals should be assessed as a current baseline for both the collected materials being sent to the Metropolitan Sewer District (this fact should also be mentioned) and for the treated leachate after MSD treats it. Will there be monitoring of how MSD disposes of the leachate or is this their problem? Is there a contract between DOE and MSD for leachate collection, treatment and disposable (as there should/must be)? This contract should be included in Appendix A or in another suitable LTSM plan Appendix.

Response A-165: DOE will include baseline leachate chemistry in Section 3.6.3. Chemical and radiological characteristics of the leachate have been monitored since the first waste was placed into the disposal cell and an extensive database exists.

MSD is responsible for ensuring that effluent from their facilities meets standards for discharge. Currently, every time leachate is hauled from the WSS to MSD, a sample is required to be collected and analyzed for a number of chemical and radiological parameters prescribed by MSD. These data are required to be submitted to MSD on a monthly basis as long as leachate is hauled to them. MSD has their own monitoring and reporting requirements prescribed by the MDNR and we do not monitor these reports. The MSD allocates radioactivity to its customers and has allocated 0.015% of its annual capacity to the WSS. The remainder is allocated to other customers (hospitals, universities, industry, etc.). MSD issues approvals, through an application process, to haul leachate to their facilities that prescribe the allowable volume, characteristics, monitoring and reporting requirements. Approval authority granted by MSD to DOE for leachate disposal is indicated in Table 3-7. DOE does not intend to include this agreement in the LTS Plan. This approval is valid for five years. Prior to the five year expiration date, another application will be submitted for approval.

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Page 63 (DOE Page 3-7)

Interpretive Center, Administration Building, Sanitary wastewater Treatment System, and Associated Grounds.

- Suggestions:

A-166

a) "The details of usage agreements will be determined" is inadequate for a legally binding document such as the LTSM plan. The agreements should be finalized as soon as possible and placed into an Appendix before this plan is approved by MDNR and EPA.

Response A-166: DOE will revise this language when the usage agreements are finalized. DOE does not intend to include this agreement in the final LTS Plan.

A-167

b) Has St. Charles county actually agreed to "assume responsibility for building and grounds maintenance and capital improvements within the region shown on the final agreement"? If so, details need to be summarized here. If not, this statement is inappropriate and inaccurate and needs to be revised to reflect the actual state of affairs to show this is a goal rather than an actuality as is implied in the 8/09 draft.

Response A-167: Negotiations are still on-going with the Saint Charles County Government. The outcome is likely to be a use agreement. This agreement will not be essential to meeting the long term stewardship requirements at the site and therefore will not be described in detail in the LTSP. If the County does not agree to use the facilities, DOE will make other arrangements for buildings and grounds maintenance.

A-168

c) What is meant by "is being negotiated?" One result is that the county may decline this proposed agreement.

Response A-168: See response to comment A-167.

A-169

d) What are the proposed provisions of the "long term use permit." **Again, the public wonders why all of these key arrangements are undone. Each undone task adds to the growing criticism that DOE's ending of the remediation phase of WSS is arbitrary and premature—in short, much of the necessary administrative work hasn't gotten done. The disposal cell may be capped, but large amounts of documentation remain to be created (not just finalized).** ***It is misleading to Congress and the public to enter into the LTSM phase on October 1, 2002*****. This appears to be driven by political and economic expediency. As Pamela Thompson has stated at the 6/27 public workshop, at least two years of work remain for the remediation team even though remediation will officially end on 9/30/02**. Because of that fact, I feel the end of the remediation phase should have been 9/30/2004.

Response A-169: See response to comment A-167.

3.6 Environmental Monitoring

3.6.1 Ground water monitoring

A-170

• Suggestions: This section is totally vague and needs to spell out in detail what will be done. I find it truly alarming that this section is not better defined at this late stage of the LTSM formulation phase and after more than two years of stewardship document preparation and review by MDNR, WSCC and other stakeholders. As expressed at a WSCC gathering on 8/22/02, "we appear to back to square one in the stewardship planning process." All the hard work of the past two years appears to have been disregarded in the preparation of this draft.

Response A-170: The plan provides the locations, frequencies, and analytes for monitoring at the Quarry Residuals and Chemical Plant OUs, as well as the protocols for conducting that work, in Section 3.6.1. DOE wil continue existing monitoring for the chemical plant groundwater until a final decision is reached via the CERCLA process.

A-171 a) "... may conduct ... according to DOE Order 5400.1" is meaningless unless one has access to this agency Order. The key provisions should be stated here or in an Appendix.

Response A-171: This Order is readily accessible from several sources, including http://www.gjo.doe.gov/programs/ltsm/general/Proj_info/reg-drvs.htm. Monitoring conducted in response to this guidance is outside the scope of remedy implementation defined in the RODs and the RD/RA Work Plans. Nonetheless, DOE will include results of any monitoring additional to that required in the LTS Plan in reports to stakeholders and regulators.

A-172 c) Ground water monitoring "locations, methods and procedures" need to be spelled out in detail. Referral to yet another unavailable DOE document (DOE 2001f) is inadequate.

Response A-172: See response to comment A-170.

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Page 64 (DOE Page 3-8)
3.6.1.1 Disposal Cell Detection and Compliance Monitoring
• Suggestions:
A-173 a) The subsection heading needs to be bolded to comply with other sections.

Response A-173: Comment noted.

Table 3-4. Detection Monitoring Program ...
• Suggestions:
A-174 a) The monitored wells should include all of the "top three" that have the highest historical levels of radioactivity.

Response A-174: The disposal cell monitoring program conforms to the requirements of 40 CFR 264 Subpart F. Monitoring for groundwater at the chemical plant will be developed in the appropriate remedial design documents.

A-175 b) Spell out where the baseline comparison data will be kept and be available to public access

Response A-175: Section 3.6.1.1, paragraph 2 specifies that disposal cell detection monitoring results will be compared to the concentrations presented in Table 2-9 of the LTS Plan.

A-176 How do you define “significant increase?” Is this + 2 standard deviations above the historical baseline average or some other measure? Details such as this must be supplied in the plan for it to be meaningful and to facilitate monitoring the plan is being followed and complied with. Suppose, for example, the unstated definition of “significant” changes (for example, someone decides to make +3 SD the criterion), no one outside DOE would ever know who needs to know (EPA, MDNR, WSCC for examples).

Response A-176: Agree. This wil be stated in more detail in the text.

A-177 c) **Appendix F detailing the Ground Water Monitoring Plan is completely empty**. Hence the statement “... (Appendix F) indicates... is once again inaccurate. ” his is unacceptable and again merits the comment that remediation is officially ending before the work is done (premature closure). In this case the final Ground Water ROD has not even been created.

Response A-177: DOE is presently in the process of updating the subject document. DOE will include Appendix F in the next revision of the LTS Plan.

A-178 d) A summary statement should be made here anticipating the date the GW ROD will be completed.

Response A-178: See response to comment A-64.

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Page 65 (DOE Page 3-9)

3.6.1.3 Quarry Residuals Operable Unit

- Suggestions:

A-179 a) Why is the change to DOE 2000c monitoring justified: (a) before the GW ROD is completed, and (b) when the present monitoring plan at the Chemical Plant will be carried forward until the final ROD is in place?

Response A-179: It is important to remember that the quarry groundwater (discussed in the Quarry Residual Operable Unit Section 3.6.1.3) and the chemical plant groundwater (discussed in the Groundwater Operable Unit – Section 3.6.1.2) are handled under separate operable units. The monitoring discussed in this section of the LTS Plan refers to the Quarry groundwater and not the chemical plant area groundwater. The monitoring requirements being implemented in accordance with *the Remedial Design/Remedial Action Work Plan for the Quarry Residuals Operable Unit* (DOE 2000c) as specified in the LTS Plan, are appropriate since quarry reclamation has been completed. Groundwater monitoring at the chemical plant area will continue under the Environmental Monitoring Plan until the Groundwater Operable Unit Record of Decision is in place. At that point, monitoring requirements will be identified in the Remedial Design/Remedial Action Work Plan for the Groundwater Operable Unit.

A-180 b) Why, if the “source of the ground water contamination” has been eliminated by remediation are uranium levels elevated (see Table N-N 362 pCi/L) above natural background in Femme Osage Slough and many Quarry outflow monitoring wells?

Response A-180: Elimination of the source of contamination (bulk wastes) results in the addition of no new contamination to the groundwater; however, the reduction of contaminant concentrations in groundwater is dependent upon many other factors (i.e., groundwater flow rates, precipitation, sorption/desorption, dilution, and dispersion). The groundwater itself and uranium sorbed onto the aquifer matrix are continued sources to the groundwater. The Femme Osage slough is directly south of the quarry and is known to receive contaminated groundwater from the quarry through subsurface recharge. As groundwater concentrations decrease, the impact to the slough will diminish.

A-181 c) Referring back to Quarry residuals OU ROD (DOE 1998) is inadequate—the provisions relevant to this section at least need to be summarized here and the details need to be included in Appendix F (when it is written).

Response A-181: The reference provided is incorrect. The correct document should be the Remedial Design/Remedial Action Work Plan for the Quarry Residuals Operable Unit (Jan. 2000). Appendix F will contain the Sampling Plan for the disposal cell groundwater monitoring.

A-182 d) Quarry "constituents of concern" as "uranium and 2,4-DNT" must be justified as to why these are the only ones. What about other radioactive nuclides (thorium, radium) and heavy metals (lead, arsenic) that is, all of the components being monitored in the Disposal cell listed on p. 64, in Table 3-4.

Response A-182: Contamination of groundwater underlying the quarry area was characterized from data collected over a 10-year period. This included a broad spectrum of radionuclides, metals, and anions as presented in the Remedial Investigation. These data were evaluated in determining the nature and extent of contamination and the potential health risks associated with drinking this groundwater. Uranium and nitroaromatics are the contaminants of concern identified in the Quarry Residuals Record of Decision based on risk. For the purposes of long-term monitoring, parameters have been selected based upon the following criteria: [1] Parameters that are primary contaminants in the quarry groundwater (uranium and nitroaromatics) and [2] parameters that characterize or indicate changes in the geochemistry of the shallow aquifer. These criteria were presented in the *Remedial Design/Remedial Action Work Plan for the Quarry Residuals Operable Unit* (DOE 2000c). No changes will be made to the parameters presented in the LTSP. The parameters to be monitored include uranium and nitroaromatics. The uranium in ground water is affected by the oxidation potential (Eh). Geochemical parameters to be measured include pH, Eh, sulfate, and iron oxidation state.

A-183 e) **Accepting 16 pCi/L as historical background as appropriate and protective of the health and public safety is unacceptable since this represents uranium contamination from the quarry rather than naturally occurring uranium**. The 0.93 pCi/L level should be used. This policy, if adopted and approved by EPA and MDNR, will *deliberately harm the public* since levels of 16 pCi/L uranium in public water systems have been shown in the medical literature [REF 1] to promote renal (kidney) failure (nephritis). **The advice of ATSDR about this key policy should be sought**.

[REF 1: TEXT]

Response A-183: The 0.93 pCi/l referenced in the comment is not an appropriate uranium background to use for groundwater at the quarry. The 0.93 pCi/l is the background identified for the groundwater in the weathered Burlington-Keokuk and overburden formations at the chemical plant area. Average uranium background in the alluvium at the quarry is 2.77 pCi/l. The maximum uranium value in the Darst Bottoms is 14.3 pCi/l. The text will be revised to corect the 16 pCi/l reference. Details concerning the background concentrations for the quarry groundwater will be added to Section 2.4.3.2.

The U.S. EPA promulgated a drinking water maximum contaminant level of 20 pCi/l on December 7, 2000. Which is greater than the values observed in the Missouri River alluvium. The new regulation, 40 CFR 141.66, will take effect December 8, 2003.

A-184

f) The "administrative target level" of 300 pCi/L uranium north of the Slough, in the absence of any Institutional Controls, is not sufficient to protect the public health and safety as they use the Conservation Area. Obviously, this number was adopted not based on protecting the public health and safety but based on expediency and cost of remediation considerations. Another remedy would have been to shut down and close off the entire area that now "hosts" the Katy Trail.

Response A-184: Consistent with the remediation goals outlined in the Record of Decision, the goal of the long-term monitoring being performed for groundwater north of the slough is to observe reduction in the uranium concentrations so that the amount of uranium that could potentially migrate to the St. Charles County well field is likewise reduced. Therefore, a target concentration equivalent to 10% of the maximum concentration would present a 90% reduction of the amount that could potentially migrate. The approach is considered to provide further protectiveness to the St. Charles County well field in addition to the already protective conditions that currently and will continue to exist.

The vulnerability of the St. Charles County well field to impact from groundwater originating from the quarry has been the focus of several studies performed. It was determined from these studies that recharge from the area of impact accounts for less than 1% of the total flow through the St. Charles County well field. Under current conditions, the groundwater north of the slough poses no imminent risk to human health from water obtained from the well field. If after attainment of the target level of 300 pCi/l, attenuation mechanisms (i.e., precipitation and adsorption) were to become ineffective, the increase to the well field would be 3 pCi/l. Future conditions are expected to be similar to current conditions, if not better, because the source of contamination has been removed.

Use of the Katy Trail is a recreational scenario. This scenario does not have a groundwater component because there is no exposure pathway to the groundwater, since it is located below the ground surface. The health risk associated with the uranium concentrations in the Femme Osage slough has been evaluated. No institutional controls on the surface water or sediment in the slough are necessary because the concentrations

do not exceed a 10-6 risk under a recreational or residential scenario. Institutional controls will be established to restrict extraction of groundwater for any use.

A-185 g) **I need to note for the record that I recently sent two mailings to officials at MDNR (Geller, Mahfood, Erickson, Moore) dated mm/dd/yy and mm/dd/yy and have not received any confirmation or answers to my seven questions [this document is attached].** This is entirely distressing because they are Missouri citizen's primary oversight agency at the Weldon Spring, Missouri, Site which is the subject of this 8/9/02 draft LTSM plan.

Response A-185: Comment noted.

A-186 h) The figure quoted of 2,740 pCi/L of uranium is quite high, a severe danger that merited strict ICs. In my opinion, all fishing should have been/should be in the future prohibited in the Femme Osage Slough. The monitor well "farm" along the Katy Trail should have been identified by signs stating what the wells represent and why (specifically) they are at that location (to protect the public drinking wells from radioactive contamination by uranium).

Response A-186: Although the uranium levels in the groundwater north of the slough have had concentrations up to 8,600 pCi/l, the maximum concentration detected in the slough was 362 pCi/l. This value was detected in 1991 prior to removal of the bulk wastes from the quarry. Present day concentrations are significantly lower (Maximum [2001] = 27.5 pCi/l) and have shown a steady decrease (2001 ASER). The risks for a recreational visitor at the Femme Osage slough were estimated in the *Baseline Risk Assessment for the Quarry Residuals Operable Unit*. The radiological health risk was estimate at 3 x 10E-7 from exposure to contaminated surface water, sediment, and fish at the slough. This risk was calculated using the UCL 95 or the maximum concentration from data collected between 1986 and 1998; whichever was lower (per EPA guidance). Concentrations in the slough have decreased since that time; therefore, the risk levels have decreased. Prohibiting use of the slough for fishing is not warranted.

Signs on the monitoring wells are not necessary since these wells provide no health risk to the public. Signs could attract tampering. All monitoring wells at the Weldon Spring site are secured with locks to prevent tampering and unauthorized access. These wells have been installed to monitoring the uranium and nitroaromatic compound concentrations within and downgradient of the area of impact.

A-187 i) The area "north of the slough" needs to be recognized by the public as still contaminated and this can only be done by signs that state (a) the nature [uranium] of the contamination, and (b) the amount of the uranium contamination. The public will see the "4 lines of monitoring wells" and be puzzled what they represent. Are they decorations? Perhaps they are like a playground that MDNR has erected for "family fun and enjoyment, etc. The point is, there is no way for them to know.

Response A-187: The area north of the slough does not require warning signs as there is no danger to the public from current recreational use of this land. DOE does not believe that the public will be "puzzled" by the continued presence of monitoring wells.

A-188 j) The narrative of this stewardship plan needs to explain, for the record, how the area "north of the slough" came to be contaminated ("... has been detected... one wonders when, the dates should be stated?) with 2,4 DNT? This is puzzling because the manufacturing plant was four miles away. In my view this document should play at least *three roles*: (a) first and foremost act as a legally binding contract that spells out specifically and in detail exactly what is the role of each and every agency at WSS; (b) to serve as a baseline description of the state of WSS at the time stewardship begins and active remediation ends, including the premature status of the closure effort as "things not done yet"; and (c) to serve as an educational vehicle for regulators and stakeholders including the public.

Response A-188: Section 2.4.1.2 states that groundwater at the quarry was contaminated by leaching of uranium and nitroaromatic compounds from the stored wastes. This section will be expanded to discuss the waste disposal use of the quarry by both the AEC and the Department of the Army. Nitroaromatic compound contamination was not the result of groundwater contamination at the former ordnance works site or the chemical plant, but from contaminated process residues and building rubble disposed of by the WSOW.

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A-189 **Page 66** (DOE Page 3-10)
Table 3-5. Ground Water Monitoring Program for the Quarry at WSMS
• Suggestions:
a) This crucial part of the plan should be modified so that ALL WELLS, including Line 3 and Line 4 (the most critical) are monitored for the same contaminants.

Response A-189: DOE indicates in Table 3-5 that all wells in the Quarry Residuals OU monitoring network are monitored for the same analytes.

A-190 b) The construction plans and documents authorizing the construction plans for the RMW1-4 Remington wells should be included in the site legal documents in the now empty Appendix A. The fact that Line 4 "Remington" wells were constructed by St. Charles county is evidence how important the county thought water monitoring was and should be grounds for increasing the monitoring frequency to make on a parity with the named wells in Lines 1-3.

Response A-190: Monitoring well logs are not legal documents. These logs will not be provided in Appendix A. These wells were installed by St. Charles County, therefore DOE has no authorizing documents. Construction specifics will be included in an appendix. See response to comments A-12 and A-191.

A-191 c) **The PW01-09 public drinking wells should be included in the monitoring plan**.

Response A-191: In addition to DOE's monitoring identified in the LTSP, St. Charles County has its own well field monitoring program that was initiated in 1989 as a result of cooperative efforts between the DOE, St. Charles County, and MDNR. This program is funded by a DOE grant. The program currently consists of annual, quarterly, and monthly sampling events of five of the operating production wells (PWs), monitoring wells (RMW-series), and raw and treated water from the water plant. Presently, the county (through an independent contractor) splits quarterly samples with the DOE and MDNR for independent analyses. Samples from the eight remaining monthly events are not split.

Monthly samples are analyzed for total uranium, gross alpha/beta, and nitroaromatic compounds (6 primary compounds). The quarterly samples are also analyzed for arsenic, barium, and sulfate. On a semiannual frequency, the samples are also analyzed for Ra-226, Ra-228, and isotopic Th.

Since monitoring of the wellfield production wells is already being performed under the DOE grant by the county and the RMW series wells represent the same alluvial aquifer, the production wells will not be added to the monitoring program identified in the LTSP.

A-192 d) The key goal here is to protect the St. Charles county public drinking water wells and this should be stated more explicitly.

Response A-192: Discussion of the protection of the St. Charles County well field is included in Section 3.6.1.3.

A-193 e) In Table 3-5 other known historical contaminants should be added to the "Analytes (all wells)" far right column: gross alpha and gross beta (now not zero and periodically elevated). arsenic, lead, barium, TCE (under active remediation and known to be toxic to humans [MCKEEL REF 2]), nitrates.

Response A-193: See response to comment A-182. TCE and nitrate are contaminants of concern in the chemical plant groundwater.

A-194 f) **The means by which the public and regulators outside DOE will have access to this crucial well field related water monitoring data should be stated explicitly**.

Response A-194: Data will be hosted on the GJO website and will be included in annual reports.

A-195 g) The "cleanup ... target uranium concentration of 300 pCi/L" needs to modified downwards in order to fully protect the public health and safety. Or, the levels need to be further actively remediated. Failing this, strict ICs need to be instituted to isolate fisherman and trail users from this highly contaminated region.

Response A-195: Consistent with the remediation goals outlined in the Record of Decision, the goal of the long-term monitoring being performed for groundwater north of the slough is to observe reduction in the uranium concentrations so that the amount of uranium

that could potentially migrate to the St. Charles County well field is likewise reduced. Therefore, a target concentration equivalent to 10% of the maximum concentration would present a 90% reduction of the amount that could potentially migrate. The approach is considered to provide further protectiveness to the St. Charles County well field in addition to the already protective conditions that currently and will continue to exist.

The quarry interceptor trench field study was performed to address the need for and effectiveness of groundwater treatment. The conclusion of the study was that active remediation of groundwater using an extraction method is an ineffective remedy. However, compared to the other remedies, it was deemed to be the most likely to succeed and therefore was evaluated under this study. The remediation strategy for the quarry groundwater was agreed upon in the ROD, which was approved in September 1998.

The risks for a recreational visitor at the Femme Osage slough were estimated in the *Baseline Risk Assessment for the Quarry Residuals Operable Unit*. The radiological health risk was estimated at 3 x 10E-7 from exposure to contaminated surface water, sediment, and fish at the slough. This risk was calculated using the UCL 95 or the maximum concentration from data collected between 1986 and 1998, whichever was lower (per EPA guidance). Concentrations in the slough have decreased since that time; therefore, the risk levels have decreased. Prohibiting use of the slough for fishing is not warranted.

Use of the Katy Trail is a recreational scenario. This scenario does not have a groundwater component because there is no exposure pathway to the groundwater because it is located below the ground surface. The health risk associated with the uranium concentrations in the Femme Osage slough has been evaluated. No institutional controls on the recreational use of this area are necessary. Institutional controls will be established to restrict extraction of groundwater for any use.

A-196 h) **An explanation why the uranium levels so high now that the Quarry has been completely remediated needs to be inserted here**. If they are allowed to stand, then this document becomes a sad testimony to federal and state government expediency at the expense of the public health and safety.

Response A-196: Additional text about the levels of contamination is not necessary in the discussion regarding environmental monitoring for the Quarry Residuals Operable Unit. The extent of groundwater contamination is presented in Section 2.4.1.2.

It was recognized during the selection of the long-term monitoring for the quarry that concentrations would not decrease rapidly. Bulk waste removal was completed in 1995. Since that time, uranium concentrations in groundwater have generally decreased.

A-197 i) Also, if this is a realistic level based on current contamination levels, then strict barriers and signs to warn and protect the public are mandatory. I predict that if this is not done, there will be and should be a flood of adverse media publicity and third party

notifications of the users of the Weldon Spring Conservation Areas and Katy Trail State Park, Weldon Spring.

Response A-197: Again, barriers and signs are not needed as there is no risk to the public from the current recreational use of this area that has no exposure pathway to groundwater.

A-198 j) **I cannot disagree more strongly with the statement that "different monitoring objectives north and south of the slough" should exist except for expediency to deal with the admitted heavier uranium contamination north of the slough. The monitoring goals should be based on a desire to fully protect the public health and safety. It is true that the uranium north of the slough is closer to Katy Trail State Park and to recreational hikers**.

Response A-198: The quarry monitoring program has two primary objectives: (1) Monitor uranium concentrations in groundwater south of the slough to verify that the groundwater is not impacted, and (2) Monitor contaminant concentrations within the area of impacted groundwater north of the slough until they attain target concentrations indicating negligible potential to degrade the groundwater quality south of the slough. These two objectives have been established because the groundwater south of the slough is not impacted (does not exceed the MCL for uranium) and therefore is being monitored to verify that impact does not occur until the monitoring objective north of the slough is attained. The objective for the monitoring north of the slough, where groundwater impact occurs, is to provide sufficient data for valid statistical analysis of groundwater conditions. Monitoring frequencies were selected based on groundwater travel times from north of the slough to south of the slough. The monitoring approach for the quarry area is presented in Section 3.6.1.3 of the plan.

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Page 68 (DOE Page 3-11) <==DWM review stopped here 8/27/02 0657 hrs

3.6.2 Surface Water Monitoring

3.6.2.1 Chemical Plant Operable Unit

A-199 • Suggestions: How frequently and what contaminants will DOE monitor in 6301 should be restated briefly here to avoid ambiguity in what will be done by alluding to another section of the draft plan. Not only should the draft plan be a stand alone resource, but this philosophy should ideally apply (within reason) to all subsections of the document.

Response A-199: Comment noted. For sake of brevity and to avoid repetition, DOE declines to revise the LTS Plan as suggested in this comment. DOE seeks to state each fact and describe each activity one time throughout this plan so subsequent revisions do not overlook changes to the same information that must be made in multiple places.

3.6.2.2 Ground Water Operable Unit

3.6.2.3 Quarry Residuals Operable Unit

3.6.3 Disposal Cell Leachate Collection and Removal System Monitoring and Operation.

A-200 • Suggestions: That monitoring records will be stored at GJO with other site records indicates again the need to precisely spell out where documents will be stored and apportioned between on-site, libraries and GJO. The document sounds like the Administrative Record documents might be transferred to GJO in Colorado. That would be a different plan than has been explained to the public all along by the WSSRAP remediation team.

Response A-200: See response to comment A-142.

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Page 68 (DOE Page 3-12)

3.6.4 Air Monitoring.

3.7 Institutional Controls Monitoring

A-201 • Suggestions:

a) The length and expiration date of DOE's NPDES permit should be given.

Response A-201: DOE states in Section 3.10 that the Department will keep the permit current. The length and expiration date are not critical information.

A-202 b) State how a DOE-GJO inspection team is qualified to evaluate "if evidence indicates that those controls do not fully protect human health and the environment?" This statement is an empty unrealistic promise.

Response A-202: DOE will retain specialists in appropriate fields to evaluate the evidence and make recommendations. The text does not indicate the evaluation will be conducted by only the members of the on-site inspection team. See the LTSM 2001 Program Report at http://www.gjo.doe.gov/programs/ltsm/general/index.htm for an overview of stewardship activities conducted for DOE's stewardship sites.

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Page 69 (DOE Page 3-13)

3.8 Regulatory Compliance Monitoring

A-203 • Suggestions:

a) Are the well registrations being tracked currently? Does DOE or MDOH have this data?

Response A-203: Water wells undergo a rigorous review process under the state's well construction rules. New wells must be certified and registered with the MDNR-DGLS, which maintains these records.

A-204 b) How is it possible to "inspect" bedrock aquifer and uranium reduction zone unless one envisions a major mega-development will take place in the quarry area. Proper IC's will make that impossible.

Response A-204: DOE believes the commentor is referring to Section 3.7, subheading "Chemical Plant and Quarry," which states, "…inspectors will look for indications of excavation of soils and bedrock at the DOE-owned property or in the uranium reduction zone area…" DOE does not intend to revise this text on the basis of this comment.

A-205 c) Methods of warning about non-compliance should be detailed (how, who, when).

Response A-205: Section 3.8, paragraph 2, sentence 3. DOE will revise this sentence to read, "…if DOE identifies instances of noncompliance that necessitate corrective action, DOE will inform EPA and MDNR of site conditions as soon as they are assessed."

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Page 70 (DOE Page 3-14)

3.9 Emergencies, Contingency Plans, and Corrective Action

- Suggestions:

A-206 a) This section should acknowledge 9/11/01 type terrorist acts and bombing using a dirty bomb scenario in this part of the plan. A statement yea or nay needs to be asserted whether testing has been done to establish probable effects of a truck bomb or heavily fueled commercial airliner crashed in to the disposal cell. I find it odd and troubling that DOE would overlook this aspect altogether. Kay Drey has written Energy Secretary Abraham and Gov. Tom Ridge at Homeland Security about her terrorist concerns and the disposal cell as an open target. Once again, legally speaking the cell is a very attractive nuisance.

Response A-206: DOE will attempt to resolve security issues and potential terrorist threats in the next revision of the LTSP. We also expect to discuss this issue during a public focused work session this fall.

A-207 b) Define "statistically significant" in section 3.9.1 "Disposal Cell Detection and Compliance Monitoring."

Response A-207: See response to comment A-176.

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Page 71 (DOE Page 3-15)

3.9.2 Ground Water Contingency Actions

- Suggestions:

A-208 a) The springs in the monitoring network should be identified by number.

b) The statement in 3.9.2.2 that "uranium concentration south of the slough are within the range of background concentrations for the Missouri River alluvium" makes a questionable assumption that Darst Bottoms, located within the same bedrock aquifer is somehow different from the well field. This is comparing self to self which are expected to be the same. I have never seen any other more distant Missouri River alluvium uranium data. State the location/s sampled along the Missouri River, the uranium level measured in pCI/L, the range of years and any data indicating the site was away from a contaminated Superfund site. If it exists, Jeff Imes USGS-Rolla said to me recently he is unaware of it.

Response A-208: The text will be revised to identify the springs to be monitored by their appropriate designation.

The Darst Bottoms is part of the same Missouri River alluvial system that the St. Charles County well field is located, however, it is located upgradient or upstream of the county well field. Neither of these are bedrock aquifers, but rather an alluvial (unconsolidated river sediments) aquifer, primarily recharged by infiltration from the Missouri River. The concept behind establishing background is that concentrations of naturally occurring constituents are established in the same aquifer system if it is possible to monitor upstream or upgradient of the area of interest. If this is not possible, then background is determined in a similar aquifer type. It is the fortunate case at the Weldon Spring Quarry that background could be established in the same aquifer system upgradient of the area of impact (Darst Bottoms). Therefore it is correct to say that we are comparing "self to self" and if impact has not occurred in the St. Charles County well field then the concentrations at both locations are expected to be similar.

The DOE is unaware of other monitoring that may have taken place in the Missouri River alluvium. The DOE established site-specific background concentrations for the Missouri River alluvium in cooperation with the USGS in 1991.

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Page 72 (DOE Page 3-16)

3.9.3 Disposal Cell Contingency Actions

A-209 • Suggestions: The Table 3-6 that extends through page 75 (3-19) should somewhere acknowledge 9/11/01 type terrorist acts and bombing using a dirty bomb scenario in this part of the plan. A statement yea or nay needs to be asserted whether testing has been done to establish probable effects of a truck bomb or heavily fueled commercial airliner crashed in to the disposal cell. I find it odd and troubling that DOE would overlook this aspect altogether. Kay Drey has written Energy Secretary Abraham and Gov. Tom Ridge at Homeland Security about her terrorist concerns and the disposal cell as an open target. Once again, legally speaking the cell is a very attractive nuisance.

Response A-209: See response to comment A-206.

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Page 73 (DOE Page 3-17)

• Suggestions: No changes.

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Page 74 (DOE Page 3-18)

• Suggestions: No changes.

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Page 75 (DOE Page 3-19)

3.10 Permit and Agreement Administration

3.11 Budget and Funding

3.12 Public Participation

• Suggestions:

A-210 a) These key sections are so skimpy as to be questioned as good faith efforts. Funding sources and state of current and announced future funding must be

addressed fully here. The public participation plan must be presented as a far more detailed blueprint.

Response A-210: See response to comment B-56.

A-211

b) What is the current status of these 19 permits and agreements? Have they been created yet? If so, why are they not in Appendix A and/or B?

Response A-211: This table will be updated in the next version of the LTSP. Agreements which are institutional controls will be removed to Appendix B. The remaining list of existing agreements is for reference only.

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Page 76 (DOE Page 3-20)

Table 3-7 Permits and Agreements for the WSMS

3.13 Records and Data Management

A-212

• Suggestions: The opening statement of 3.13 and the text on the next page (3-21) indicates that many crucial documents will not be on-site but rather at GJO. There is no written agreement between DOE and the St. Charles county library system. There is no satisfactory resolution of the status of DOE documents as government documents under Title 44 U.S. Code. Mr. Sherman of GJO states he believes DOE documents do fall under Title 44 unless a specific exemption can be invoked.

Response A-212: Crucial stewardship documents will be kept with the site steward in Grand Junction. DOE will maintain access to the complete administrative record at the Interpretive Center.

In addition to the administrative record, access to key site documents created during stewardship (e.g., annual site inspections, monitoring information, maps, and 5-Year Reviews) will also be accessible at the Interpretive Center. At this time an on-line system (http://www.gjo.doe.gov/programs/ltsm/) is available through the DOE Grand Junction Office LSTM website to view and search select site records.

In accordance with Federal regulations, the record copy of the site records will be transferred to a federal records center for long-term protection and storage in accordance with practices and disposition schedules approved by the National Archives and Records Administration. The Federal archives in Kansas City already contain site records.

==========

Page 77 (DOE Page 3-21)

• Suggestions:

A-213

a) Change local stewardship “may include” to “will include” and thus not avoid coming to a full resolution of the issue delineated in my comments on page 76. What exemption to U.S.C Title 44 can DOE cite that exempts their documents from being GJO federal depository documents?

Response A-213: Section 3.13, subheading “Access and Retrieval”, paragraph 3. DOE will change “may” to “will” but cannot ensure that hard copy documents will not be removed from the collections. For that reason, DOE recommends use of the on-line portal to Weldon Spring documents. Please see the response to Comment A-212.

A-214

b) Change “annual reports” to “annual environmental reports.”

Response A-214: Annual reports will include also inspection results, descriptions of maintenance activities, and other activities that occurred during the period covered. DOE declines to make this change.

A-215

c) Cite why (with correspondence and statutory authority that supersedes GJO-Title 44) the Regional Records Center in Kansas City will be the “designated archive facility” for WSS records. Does this also include WSOW records?

Response A-215: The Kansas City Records Center is the designated records retention center for the WSS due to its geographic location within the region served by the Kansas City Center. WSOW records should also be archived in Kansas City.

A-216

d) How can records be stored at the Interpretive center if it is unmanned? Has there been a funding commitment to make this a manned interpretive Center? Has the WSCC and citizen’s request for electronic access to Administrative Records documents been considered and accepted or rejected?

Response A-216: See response to comment A-142.

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Page 78 (DOE Page 3-22)

- Suggestions:

A-217

a) The public has no access to the DOE-GJO health and safety manual and LTSM Program project safety plans mentioned under ***3.15 Health and Safety***. Thus, a fuller description of hat these documents entails should be included here. Copies should be maintained on-site in the Interpretive Center so the public can judge the adequacy of these documents themselves.

Response A-217: These are administrative documents pertinent to DOE employees and contractors; the documents address occupational health and safety.

A-218

b) Why under section Regulatory Requirements is Title 44 U.S. Code not included as Mr. Sherman of GPO indicated it should be? What exemption does DOE cite to take Weldon Spring Site documents out of Title 44 jurisdiction?

Response A-218: This regulation is not listed as an ARAR in the LTS Plan because it is not identified as an ARAR under CERCLA.

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Page 79 (DOE Page 4-1)

4.0 References

• Suggestions: No changes.

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Page 80 (DOE Page 4-2)

4.0 References

• Suggestions: No changes.

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Page 81 (DOE Page 4-3)

4.0 References

• Suggestions: No changes.

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Page 82 (DOE Page 4-4)

4.0 References

• Suggestions:

A-219

a) Add book by Norman Muschany, "The Rape of Hamburg, Howell and Toonerville", (self published), St Charles county and St. Louis City main public library downtown, non-circulating rare book room

b) Add article: Dupree-Ellis E et al. Am J Epidemiol July 2001.

c) Add book: nnnn,nnnnn, Anderson R. "Radiation Pathology", 2002

Response A-219: DOE believes this book is more appropriately suited for inclusion in a local historical collection. DOE intends the LTS Plan to focus on post-closure care of the Weldon Spring site.

For comment b) — Comment noted.

For comment c) — Comment noted.

A-220

d) An explanation of which documents are available on-site as part of the Administrative Record, off-site within DOE as part of the Administrative Record, off-site from DOE, and records that are not available through DOE (but are available at St. Charles county library system) should be indicated. Only those documents that are to be kept physically on-site should be referenced in the LTSM plan without incorporating a synopsis or an excerpt of the relevant text into the plan document.

Response A-220: As stated in Response A-15, DOE will maintain access to the complete administrative record, including the Administrative Record index, at the interpretive center. DOE does not intend to add the administrative record index to the LTS Plan.

Section 3.13, Subheading "Access and Retrieval," states that key site documents will be available to the public electronically through the LTSM Program document portal that will be on-line in spring 2003. Key documents include the administrative record and pertinent

post-decision documents, as indicated in the LTS Plan. The on-line system is currently available at http://www.gjo.doe.gov/programs/ltsm/. DOE will add this Internet address to the LTS Plan. This portal is accessible from any library the provides Internet access. DOE does not intend to indicate in the LTS Plan holdings of the public library system that pertain to the Weldon Spring site. All references included in Section 4.0 of the LTS Plan are either available through the LTSM Program Internet Site at the address shown above or are readily available from other sources.

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A-221 **Page 83** (DOE Page Following Page 4-4, not numbered)
Appendix A. Legal Description of the Weldon Spring Site and Real Estate Documentation
• Suggestions: Unacceptable, this is completely empty. Should be completed soon.

Response A-221: See response to comment A-5.

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A-222 **Page 84** (DOE Page A-1)
• Suggestions: The descriptions and "book and page numbers from the St Charles County MO Clerk and Recorder's office will be inserted when confirmed and recorded" seem disingenuous since all this should have been done long ago when the documents were first recorded.

Response A-222: See response to comment A-5.

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A-223 **Page 85** (DOE Page A-2)
End of current text
• Suggestions: Its going to take more than 2 pages for these documents if they are complete!

Response A-223: Comment noted.

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A-224 **Page 86** (DOE Page Following Page A-2, not numbered)
Appendix B. Instruments for Institutional Control
• Suggestions: Unacceptable, this is completely empty. Should be completed soon. Even a list of the documents to be included would have been helpful in reviewing the adequacy of this draft plan.

Response A-224: Anticipated ICs are defined in Table 2-12 of the LTS Plan.

==========

A-225 **Page 87** (DOE Page following, not numbered)
• Suggestions: "Copies of the recorded institutional controls will be inserted when available" is unacceptable, this is completely empty. Should be completed soon.

Response A-225: See response to comment A-5.

==========

A-226 **Page 88** (DOE Page B-3 number obscured)
Fig. B-1 Institutional Controls Map

• Suggestions: It is unclear whether the labeled sites will ALL be ICs or just SOME. The web reproduction is too small and details are barely legible.

Response A-226: DOE will edit Figure B-1 to add the confirmed property boundary and to indicate that the DOE-owned property between the 300-foot buffer zone and the site boundary is subject to use restrictions. The other areas addressed by ICs are shown.

==========

A-227 **Page 89** (DOE Page B-5)

• Suggestions:

a) Where is Page B-4?

Response A-227: Page B-4 is the blank backside of Figure B-1. DOE will place a page number on the back of these pages with the legend, "This page intentionally left blank" to ensure readers understand they are not missing a portion of the document.

A-228 b) ***Figure B-2. IC for the Quarry.*** Note the Katy Trail appears to have been rerouted through the heart of the still contaminated Quarry bed and has been diverted away from the monitor well lines where it has run for many years. At the WSCC 8/27/02 stewardship meeting this was explained to be boundary line. The small web map is confusing.

Response A-228: Comment noted.

A-229 c) I can't see the position of the ICs -- are they marked?

Response A-229. Figure B-2 shows the location of the ICs identified in Table 2-12. The locations are marked on the figure.

==========

Page 90 (DOE Page not numbered)

A-230 **Appendix C. Field Photograph Log**

• Suggestions: Page otherwise empty.

Response A-230: Comment noted.

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Page 91 (DOE Page C-1)

Field Photograph Log

A-231 • Suggestions: This photographic documentation form raises an important issue. PL No. implies there is an indexing scheme for site stewardship photographs. This scheme should be described in sufficient detail so that users of the document can know where to: (a) know that photographs exist, (b) know where they exist, (c) know where and how to locate and retrieve specific photographs from an electronic index (database). How will this be accomplished—be specific, please.

Response A-231: The column, "PL Number" is used by the inspection team to identify photographs that will be included in the annual inspection report. Photograph locations are

shown on field maps. Photographs that will be published are shown as photograph locations (PL's) on the published inspection maps. Photos also will be available through the GIS site. Photographs are archived as part of the permanent site record in Grand Junction. See also the response to comments A-148 and A-160.

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Page 92 (DOE Page C-2)

A-232 **Field Photograph Log**

- Suggestions: Duplicate of form on Page C-1 and same comments apply.

Response A-232: See response to comment A-231.

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Page 93 (DOE Page not numbered)

A-233 **Appendix D Site Inspection Checklists**

- Suggestions: Page otherwise empty.

Response A-233: Comment noted.

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Page 94 (DOE Page D-1)

The page starts out "Following are general notes on the checklist ..."

- Suggestions:

A-234 a) The general checklist to be used by ... " I believe may refer to the forms on Page 98 (D-5) and this should be stated to facilitate the reader being able to jump to this page.

Response A-234: Appendix D, paragraph 1, sentence 2. DOE will revise this sentence to read, "The checklist to be used by inspectors for the initial site inspection begins on page D-5."

I. General A. B. C.

- Suggestions: None

II. Preparation for the Inspection.

- Suggestions:

A-235 **a)** A statement needs to be made somewhere in this section how all referenced DOE Guidances (II.A.top bullet, for example) will be made available to the inspection team. Are they kept on-site at the Administrative Center or elsewhere? This procedure needs to be stated.

Response A-235: Guidance documents are readily available on the Internet and as hard copy documents at the Grand Junction office. Inspection teams will be dispatched from Grand Junction.

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Page 95 (DOE Page D-2)

III. Site Inspection

- Suggestions:

A-236

a) The statement “The checklist is not meant to be exhaustive or constraining” should be modified. I t seems to me at a minimum that the checklist should list every inspection activity DOE must carry out and would be exhaustive in this sense. These items could be flagged as “Mandatory!”, which would contrast them from other activities that could be classified as “Suggested” and “Use where appropriate.”

Response A-236: The checklist cannot be exhaustive because inspectors cannot know all site conditions before conducting the inspection. For this reason, DOE deploys qualified inspectors who can exercise professional judgment in the field. During inspection preparation, LTSM Program staff review notes from the previous inspection and reports of other site activities occurring since the last inspection. Inspection items derived from these sources are included in the inspection checklist. Inspectors address each item on the checklist as mandatory.

A-237

b) It doesn’t seem to be clear where the inspection report will be sent for compilation or to whom it will be distributed; both are necessary to be included here.

Response A-237: The inspectors will write the report. DOE will distribute the annual report, in which inspection results are provided, as indicated in Section 3.2.5.

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Page 96 (DOE Page D?3)

IV. Inspection Closeout Summary

A-238

• Suggestions: Under A.2 several specific examples of “serious or potential problems” should be included to assist inspectors in reporting the correct information back to GJO and stakeholders. Even better would be a specific checklist of known reportable serious and potential problems at similar radwaste disposal cell sites. The inspector would certify the serious conditions did not exist explicitly. In medicine this is referred to as putting in “pertinent negatives” (the patient did not have evidence of any cancer”, for example, serves to reassure patients and their families and is more informative than simply leaving a blank space. The latter approach leaves the reader wondering “did the inspector really look for this (serious condition)? Knowing the answer was “Yes” and that no problems have occurred is very reassuring.

Response A-238: DOE also employs pertinent negatives to indicate site status. See other annual reports published by the LTSM Program (http://www.gjo.doe.gov/programs/ltsm/maps/title1.htm) in which DOE states for most locations that inspectors observed no cause for maintenance or follow-up inspection. Inspector qualification requirements ensure field teams have the expertise and experience to identify site status issues.

Appendix D, Section IV.A.2: DOE will revise this bullet list as follows:

- Serious or threatening problems that require immediate attention or follow-up action, such as rock movement, erosion on the cell cover, or indications of disturbance in areas addressed under ICs;
- Actual or potential problems not requiring immediate attention but that require further observation possibly including a follow-up inspection, such as erosion on the quarry surface or plants encroaching on the cell cover;

==========

Page 97 (DOE Page D-4)

IV. Inspection Closeout Summary, sections B and C

- Suggestions: Both sections are very important but the description is too brief:

A-239

a) Under B.1, serious problems should be reported verbally and followed up by a written report. This section needs to spell out where these "serious condition" reports will be stored and be available for perusal and use in subsequent similar urgent situations.

Response A-239: Appendix D, Section IV.B.1: DOE will add at the end of this item, "Notification shall be made by telephone, followed by written communication with a copy submitted to the inspection case file."

A-240

b) This reporting description is too brief. A more detailed report template with main topics fields, subheading fields and space for notes should be used. The elements of site conditions, IC evaluations, and specific volumes of regulations should be stipulated here.

Response A-240: Appendix D, Section IV.B.1: DOE will add at the end of this item, "…for this site (see Section 3.2.5)."

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Page 98 (DOE Page D-5)

Site Status Report and Annual Inspection Checklist...(1-4)

- Suggestions:

A-241

a) Why is Inspectors marked "not applicable"? Inspectors should be identified by employee and badge or number. The legal responsibility and liability allocation to various inspection team members in the remote chance that someone shirked their job responsibility, or conducted a sloppy inspection, or falsified reports (in a criminal way, foe example) should be stated as clearly and precisely as possible.

Response A-241: This item is not applicable for the initial annual long-term stewardship site inspection. For subsequent inspections, this information will be provided. Identification of inspection team members beyond name is not required because of the remote possibility additional identification information is required, in which case personnel records and background check information may be readily accessed.

A-242

b) Under **3, Issue** - where is the mentioned "attached list" (of specific site surveillance features) in this document.

Response A-242: The referenced list is presented on page D-9. Please note that DOE will add to the checklist inspection of all IC areas when the LTS Plan is revised.

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Page 99 (DOE Page D-6)

Site Status Report and Annual Inspection Checklist...(5-7)

- Suggestions:

A-243 a) Anticipate use of ATVs and mountain bikes on the cell and mention looking for evidence of recreational vehicle damage to the cell exterior.

Response A-243: DOE acknowledges this concern and addressed it as the Action for Item 8 of the initial inspection checklist

A-244 b) RE: 6 and 7: Consider placing warning signs restricting use of ATVs and warning signs not to alert the public not to wander off the steps leading to the cell platform on top. This would at the same time maintain cell exterior integrity and avert danger of injury. Think of this cell as an "attractive nuisance" and that DOE is therefore subject to tort liability if adequate warning signs and access barriers to the rock portions is not maintained.

Response A-244: Comment noted.

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Page 100 (DOE Page D-7)

Site Status Report and Annual Inspection Checklist...(8-13)

- Suggestions:

A-245 a) RE 8: "Access to entire Chemical Plant and quarry area properties is unrestricted", besides being a very unwise policy, cannot be guaranteed until long-term site ownership and maintenance agreements mentioned elsewhere in the draft plan are finalized, signed and recorded as binding legal documents. The policy is particularly unwise because of the "dirty bomb" terrorist scenario which WSCC and many citizens feel is a distinct possibility.

Response A-245: Comment noted. See response to comment A-92.

A-246 b) RE 8: About which kind of "risk" is there concern?

Response A-246: DOE intended this to address personal injury risk. DOE will revise this statement to refer to Item 14 of the checklist.

A-247 c) RE 12: The statement under ISSUE "see plume maps in LTS plan" is misleading and needs to be modified: (a) to indicate the Page No. and Figure No. if such a plume map is actually in the document (I haven't seen it), and (b) if it is not included, the statement needs to be modified or a plume map needs to be produced.
Note: I have asked for such a 3-D (vertical-added) plume map to be generated from the MDNR GIS database twice in separate letters. Ben Moore told me on 8/27/02 at the WSCC meeting that MDNR was unable to supply this map to me. This is despite the fact that in the past a 2-D map of the uranium contours around the quarry was shown to me. I am not sure but I believe this was created by DOE. I lack the exact document reference.

Response A-247: See figures 2-9 through 2-12 and figure 2-15. References to these figures will be made in the text.

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Page 101 (DOE Page D-8)

Site Status Report and Annual Inspection Checklist...(14-19)

- Suggestions:

A-248 a) As mentioned under (b) Page 99 (DOE page D-6) there is an additional need for warning signs and access barriers for people and vehicles to climb on the rock cover. Why would/should this be allowed. The cell as an attractive nuisance; it is not a community playground. If signs and barriers are not erected personal injury lawsuits will be brought and probably be successful, thereby increasing taxpayer burden on top of the $900 million ± $50 M DOE has already spent to clean up an environmental their predecessor agency (AEC) created between 1957-66. Has a legal team reviewed the site for liability and carefully scrutinized this plan?

Response A-248: Comment noted. DOE acknowledges the potential for injury or damaging trespass but decided the benefit of keeping the cell highly visible outweighed the risk.

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Page 102 (DOE Page D-9)

A-249 **Specific Site Surveillance Features**

- Suggestions:

a) Postings: define the content and purpose. Who will be called and be on duty to resolve issues and act in emergencies is a critical issue. These small signs are all the public will have as resources to report something serious they see. Note: At this point it is not clear whether or not the Interpretive Center ill be manned or unmanned. Are the postings described in more detail somewhere else within this document?

Response A-249: Postings are described in Section 2.8.1. The DOE Grand Junction Office monitors telephone communications 24 hours per day. The notification phone numbers ring directly into the switchboard during business hours and into the guard station after hours. Persons monitoring the phones have instructions to contact LTSM Program personnel if DOE receives notification of a concern at any of the 31 stewardship sites administered by the Grand Junction Office. LTSM Program staff members are on an on-call rotation providing continuous coverage.

A-250 b) Spell out Feature “LCRS” - what is this?

Response A-250: DOE will spell this out. It is an initialization for leachate collection and removal system.

A-251 c) Some of these Features are premature in that who will maintain the grounds has not yet been agreed upon by DOE and St. Charles county government.

Response A-251: Comment noted.

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Page 103 (DOE Page D-10)
Five-Year Inspection Checklist for Settlement and Rock Degradation...

- Suggestions:

A-252 a) Again why is Inspectors marked "not applicable." The inspectors for the 5-year inspection, and those who prepared the inspection report, should be identified. Were they in the initial 5-Year Review?

Response A-252: See response to comment A-241.

A-253 b) Doesn't "the integrity of the radon/infiltration barrier" also have to determined during inspections by actually testing for the escape of radon gas into the atmosphere?

Response A-253: DOE monitored for radon after only 1 foot of radon barrier was placed and this barrier met the flux standard of 20 pCi per square meter per second. The additional 2 feet of compacted soil placed after the monitoring further attenuates radon gas. DOE does not identify any credible concern about radon escape in the absence of cell cover disruption. Consequently, DOE does not intend to monitor radon at the disposal cell unless a reason is identified.

A-254 c) Add Page D-11 for Table 1 and 2 to guide the reader.

Response A-254: DOE will add this reference and indicate the tables are published in the LTS Plan.

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Page 104 (DOE Page D-11)

- Suggestions:

A-255 a) Who will the report be distributed to in case undue settlement and/or rock degradation has occurred? How long is allowed for the problem to be reported verbally and in writing?

Response A-255: Please see Section 3.3.1, paragraph 4. In Section 3.9.3, paragraph 1, DOE will add to the end of the paragraph, "If a trigger is met, DOE will notify authorities in accordance with Section 3.3.1."

A-256 b) The visual assessments of percentage rock degradation from 10 random transepts would only yield a crude estimate. Better would be to use computer image analysis of total cell surface to calculate the damaged area as a percent of total area, a far more precise but yet still doable (on a PC using free N.I.H. Image type of scientific measurement.

Response A-256: Comment noted. DOE intends to use aerial and space imagery to the extent practical to increase coverage of the cell surface but has not yet validated these methods.

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Page 105 (DOE Page D-12)
U.S. EPA Draft Annual Remedy Performance Checklist

A-257 • Suggestions:

a) What does "RPM" stand for—unclear.

Response A-257: This is an initialization for Remedial Project Manager. DOE incorporated this draft checklist verbatim as received from EPA. DOE will add this definition in brackets to the checklist text.

A-258 b) I am amazed at the statement "a site visit is recommended" which should instead read "is mandatory to make the data credible and to ensure utmost accuracy." Otherwise, the report is equivalent to "vaporware" in the software industry.

Response A-258: Please see the response to Comment A-257. DOE will conduct an annual inspection.

A-259 c) I note the instructions say "attach a plume map" and remark that neither St. Charles county (Mike Duvall's office) or MDNR (Ben Moore) have been able to produce a 2-D or 3-D uranium plume map in response to multiple request I have made in 2001 and 2002. This requirement shows that DOE is expected to be able to produce contaminant plume maps that are routinely produced for uranium (or TCE or other toxic chemicals) in contaminated groundwater at other U.S. nuclear weapons facilities.

Response A-259: Comment noted. See response to comment A-247.

A-260 d) Define the term "protectiveness" under the Directions subheading.

Response A-260: DOE will be following the EPA *Comprehensive Five-Year Review Guidance* (OSWER Directive 9355.7-03B-P) that is current at the time of the 5-year review. This guidance addresses protectiveness as being protective of human health and the environment. DOE submits this does not require clarification.

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Page 106 (DOE Page D?13)
Draft Annual Remedy Performance Checklist

A-261 • Suggestions:

a) What does RPM stand for?

b) What does PRP stand for?

Response A-261: RPM stands for Remedial Project Manager. PRP stands for Potentially Responsible Party.

A-262

c) Again, the possibility of performing a five year annual review without doing a site visit is unacceptable since the indication of physical or function system failure (cell breach, settlement, etc.) is primarily done by visual inspection rather than by discussion.

Response A-262: See response to comment A-258.

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Page 107 (DOE Page D-14)

A-263

Draft Annual Remedy Performance Checklist (cont'd)

IV. On-site documents and letters

These documents are stated to be "required for the 5 year review", therefore:

- Suggestions:
  a) Are all of the documents currently held and available for inspection by the public at the Weldon Spring site?

Response A-263: This is a generic list of documents that might be needed for 5-year review sites. Those pertinent to the Weldon Spring site are maintained by on-site staff and are available for public review upon request.

A-264

b) Are all of these documents part of the formal Administrative Record and its Index? Note: It is unclear whether the entire physical Admin Record or just the Index for certain (yet undefined) documents will be maintained at the site?

c) Is there an in force Air Discharge permit the public can see?

Response A-264: Most of these documents typically would not be part of the administrative record. The administrative record includes information documenting the remedy selection process. The documents listed in Section IV of the draft EPA Annual Remedy Performance Checklist pertain generally to remedy implementation. DOE will make available documents pertaining to remedy operation and maintenance, including monitoring results, inspection results, and event logs.

No air permits have ever been required at the site.

A-265

d) Is there a Monument Settlement Record?

e) Is there a Gas Generation Records and what gas/ses are referred to?

f) The term "LTRA" needs to be spelled out to make this table clear.

Response A-265: (For d)There is not a monument settlement record.

(For e) — this item is not applicable to the Weldon Spring site and does not exist for this location.
(For f) — in the footnote on page D-14, DOE will add in brackets, "[long-term response actions]."

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Page 108 (DOE Page D?15)
V. Institutional Controls
VI. Significant Site Events
VII. Redevelopment

A-266 • Suggestions: **V. ICs**: The four basic questions under V should be in place now, or as soon as possible, for each and every Institutional Control that is to be implemented. Reviewers are at a severe disadvantage in not seeing a detailed list of what ICs are being proposed for implementation or that have been implemented. With regard to the latter, for example, MDOC states that several fenced off contaminated areas currently exist at Busch Conservation area, yet I have never seen these documented on CA maps that visitors can obtain. I have been to the admin center three times looking for such maps and have been told they are not available now and have never been according to current MDOC workers.

Response A-266: Agree. DOE has provided a detailed list of the information available as of August 9, 2002, in the draft LTS Plan; this appears in Table 2-12. DOE is not aware of any fenced areas of contamination on the Busch Conservation Area.

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Page 109 (DOE Page D-16)
VIII. Technical Data

A-267 • Suggestions:
a) Define MNA parameters.

Response A-267: MNA is an acronym for "monitored natural attenuation." DOE will add this definition in brackets after the first occurrence. Parameters are included in the analytes lists presented in Section 3.6, Table 3-4.

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Page 110 (DOE Page D?17)
IX. Remedy Performance Assessment
A. Ground Water Remedies
B. Source Control Remedies

• Suggestions:
A-268 a) How can one complete IX. A if one is unable to document the plume geometry?

Response A-268: Horizontal extents of plumes at the Weldon Spring site are presented in Figures 2-9 through 2-12 and Figure 2-15.

A-269 b) Some explanation of what “Source Control” is on an almost fully remediated site where the contamination sources have been (mostly) removed?

Response A-269: DOE has achieved source control with completion of construction for the Chemical Plant and Quarry Bulk Waste OUs.

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Page 111 (DOE Page D-18)

X. Projections

A-270 • Suggestions:

a) PRP and LTRA need to be spelled out.

Response A-270: DOE will add these terms to the acronyms list in the LTS Plan and define them in brackets when they first appear.

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Page 112 (DOE Page D?19)

XI. Administrative Issues.

XII. Recommendations.

A-271 • Suggestions:

a) Define “intent to delete.”

b) Define “TI waivers.”

Response A-271: For suggestion a) — This is a CERCLA-process term indicating intention to delete the site from the National Priorities List.

For suggestion b) — TI stands for Technical Impracticability. EPA, in consultation with the State, may grant relief from certain regulations that cannot be achieved.

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Page 113 (DOE Page D-20)

XIII. Protectiveness Statements

A-272 • Suggestions: **I see no indication that a physician, health physicist or epidemiologist will review this 5 year review document**. This is a serious omission. How can the inspection process claim to maximally protect the health and safety of the public given that only medically trained people are competent to make these health judgments.

Response A-272: See response to comment A-58.

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Page 114 (DOE Page not numbered)

Appendix E. Agency Notification Instruments.

• Suggestions: No changes.

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Page 115 (DOE Page E-1)

A-273 Except for the brief text “Following are examples of actual notification instruments” this page is empty.

- Suggestions: Complete and add the related agency notification documents.

Response A-273: Comment noted.

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Page 116 (DOE Page E-2)

A-274 End of current text - rest of page is empty.

- Suggestions: Complete the content and add it here.

Response A-274: Comment noted.

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Page 117 (DOE Page not numbered)

Appendix F. Disposal Cell Groundwater Monitoring Plan

- Suggestions: No changes.

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A-275 **Page 118** (DOE Page F-1)

“To be inserted” is the entire text on this page.

- Suggestions: Complete the content and add it here.

Response A-275: Comment noted.

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Page 119 (DOE Page F-2)

A-276 No text is on this page.

- Suggestions: Complete the content and add it here.

Response A-276: Comment noted.

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Page 120 (DOE Page not numbered)

Appendix G. Well Field Contingency Plan.

- Suggestions: No changes, an Appendix title page.

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Page 121 (DOE Page G-1)

Planning and Preparation

- Suggestions:

A-277 a) Please define “modified value engineering principles” which is a technical jargon term that has no meaning to the general public. Alternatively, cite a publication that explains this engineering approach.

Response A-277: Modified value engineering (MVE) is an alternative evaluation process that parallels the CERCLA philosophy of remedial alternative development that is not based upon cost unless all other criteria (i.e., effectiveness, implementability, etc) are equal. This is a modification of the “value engineering” principle developed in the industrial

sector where cost plays an important role. This definition will be included in the plan. The MVE process is performed as outlined in *Alternative Evaluation Study Manual* (DOE/OR/21548-640).

A-278 b) The sixteen considered alternatives in DOE 1992B should be restated here since few readers will have access to this ten year old report.

Response A-278: Comment noted. Text will be revised to provide a brief summary of the alternatives considered.

A-279 c) **Selecting Darst Bottoms is inadequate for two verifiable scientific and medically unchallengeable reasons:**

[a] *scientific*: as admitted Darst Bottoms is in the same fractured intercommunicating aquifer as the current well field wells;

[b] *medical/scientific*:

• I have personally reviewed the "Pumpingwells 1991" and "Darstbottoms 1991" DOE datasets with 7,744 records and have compared the two datasets for all measured radioactive contaminants. Darst Bottoms, like the well field, has experienced periodic spikes of radioactivity well above natural background (0.93 pCi/L) for uranium and, occasionally, above EPA drinking water limits (20 pCi/L). Gross alpha and gross beta radiation are above natural background as well in both well systems that share the same aquifer, not unexpected.

• I, therefore interpret the data as showing chronic low-level average uranium elevations throughout both well fields that are above natural background radiation levels. The most valid background would be Missouri River aquifers far away from any Superfund site or source of contamination (admittedly hard to find). Jeffrey Imes of USGS-Rolla says he does not know of any such data.

• The levels of uranium measured in *both well systems* has been shown to cause chronic nephritis, a destructive kidney disease, that is also suffered by uranium miners and was found in Mallinckrodt Chemical Works Uranium Division workers who worked at Weldon Spring Site during 1957-66 as reported in E. Dupree-Ellis et al, Am J Epidemiol, July 2001 journal issue. Kidney cancer is another effect of excess chronic exposure to uranium.

• Because there is no absolutely safe limit for radiation, the risk of the contingency plan is equivalent to the current well field risk and, in my view, is higher than should be acceptable. Clearly, the alternative of Darst Bottoms is an economic compromise decision which benefits the budgetary bottom line but harms the public health. Since only about 20% of St. Charles residents get their water from the well field now, the best contingency would be to close the current well field now and hereafter buy water from another place.

Response A-279: A total of 980 samples from the monitoring wells, RMW-series wells, and the production wells have been analyzed for total uranium. Of these, 90% have been below the average background value of 2.77 pCi/l and none of the samples have been outside the maximum range for uranium (14.3 pCi/l) observed in the Darst Bottoms wells.

Review of the 1991 production well data indicates that the total uranium and gross beta data was within background ranges. Two of the production wells had elevated gross alpha values for the fourth quarter. As discussed in the *Weldon Spring Site Environmental Report of Calendar Year 1991* (Rev. 1), The fourth quarter results were erroneously high due to laboratory interferences and were rejected based upon data validation. Data are validated to review analytical documentation and to determine the validity of any subject data point or data group. Subsequent samples have no indicated similar levels and therefore, these values are considered suspect.

The concept behind establishing background is that concentrations of naturally occurring constituents are established in the same aquifer system if it is possible to monitor upstream or upgradient of the area of interest. If this is not possible, then background is determined in a similar aquifer type. It is the fortunate case at the Weldon Spring Quarry that background could be established in the same aquifer system upgradient of the area of impact (Darst Bottoms).

Consumption of water from the St. Charles County well field does not pose a health risk. The estimated radiological carcinogenic risk is 1 x 10E-6 and the estimated hazard quotient for uranium is less than 1. The continued use of the well field is the decision of St. Charles County.

It is very difficult to make definitive conclusions between exposure to low levels of environmental contaminants, including uranium and other radionuclides, and specific illnesses such as chronic nephritis and cancer. The radiation exposures of uranium miners and workers at the Mallinckrodt Chemical Works were very high by current standards, as noted in the paper identified here. Even with these elevated exposures, the paper notes that "Internal radiation exposure or the chemical toxicity of uranium *may be* responsible for the study findings (emphasis added)." The paper also states that "The excess deaths from chronic nephritis increase the importance of considering other exposures." The authors of this paper have been careful to not identify the cause of the health effects observed in these workers, because it is scientifically incorrect to do so.

The Mallinckrodt Chemical Works handled very high content (up to 70%) uranium ore, which has a high gamma component. This gamma component, which gives rise to a high external dose rate, is due to the daughter products of uranium, principally radium and its short-lived decay products. Such a gamma component is not present with processed uranium (that is, uranium without its decay products), which would be present in the groundwater at the site. As noted in this paper, "The only indication of a dose-response relationship was between kidney cancer and external radiation. Because 26 outcomes were evaluated, this result may have occurred by chance."

We do not disagree that chronic radiation exposure can cause various cancers, including kidney cancer. Uranium exposure can also cause cancer of the bone as well as other organs. However, it is not correct to conclude that "the levels of uranium measured in both well systems have been shown to cause chronic nephritis." We know of no such data that

supports such a conclusion. Potential health effects associated with exposure to various contaminated media have been addressed using established data and procedures developed by EPA for such assessments. See also Response A-58.

A-280

c) To say Darst Bottoms would be unaffected by contamination migration either from the quarry or the **potentially tainted well field to the north** is: (a) scientifically inaccurate because of the fractured bedrock and known horizontal flow in all directions (not just down river), and (b) because potentially tainted is close to an admission the well field actually is tainted now.\

Response A-280: The Darst Bottoms is part of the same Missouri River alluvial system that the St. Charles County well field is located, however, it is located upgradient or upstream of the county well field. Neither of these are bedrock aquifer, but rather alluvial (unconsolidated river sediments) aquifers.

Flow direction in the Missouri River alluvium is controlled by the direction of flow of the Missouri River. Groundwater flow from areas of higher hydraulic head to lower hydraulic head, which is the sum of pressure head and elevation head, a fundamental element of fluid mechanics. Since the Missouri River alluvial system is an unconfined or water table aquifer, the pressure head is zero and the water table is defined by the elevation head (groundwater elevation with respect to mean sea level). Since the elevation of the groundwater is the alluvium is controlled primarily by the river stage, groundwater flow is coincident with river flow downstream. Lateral flow from the quarry is southern toward the Missouri River alluvium. Flow in the Missouri River alluvial aquifer south of the quarry is generally southeast to east. This has been depicted in numerous documents, including the USGS report “Ground-Water Flow and Ground- and Surface-Water Interaction at the Weldon Spring Quarry (USGS Report # 96-4279).

The concept behind establishing background is that concentrations of naturally occurring constituents are established in the same aquifer system if it is possible to monitor upstream or upgradient of the area of interest. If this is not possible, then background is determined in a similar aquifer type. It is the fortunate case at the Weldon Spring Quarry that background could be established in the same aquifer system upgradient of the area of impact (Darst Bottoms). The reference to “potentially tainted” is within the context of preparing a contingency plan for a worst case hypothetical occurence.

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Page 122 (DOE Page G-2)

- Suggestions:

A-281

a) No changes given the basis for selecting Darst Bottoms as the contingency remedy is in my opinion, a fatally flawed concept. **The science behind the flawed decision needs to be re-evaluated by independent third part experts not connected with any federal or state agency now operating at Weldon Spring**.

Response A-281: The DOE believes that the Darst Bottoms is an appropriate selection for Missouri River background. The DOE established site-specific background concentrations for the Missouri River alluvium in cooperation with the USGS in 1991.

A-282 b) What are the action levels established under this plan referred to in the first sentence of the "Installation of Replacement Wells section."

Response A-282: If uranium in groundwater south of the slough no longer remains below the trigger level of 20 pCi/l, DOE will reevaluate the potential for significant impacts to the well field and the alluvial aquifer. The contingencies listed in Section 3.9.2.2 will be initiated. Reference to this section will be made in Appendix G.

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Page 123 (DOE Page G-3)

A-283 • Suggestions: This key section lacks rigor in analysis by a total lack of current well field water usage and any discussion of the alternate sources of drinking water the county could purchase (as it has done for 80% of it's water supply).

Response A-283: Comment noted.

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Page 124 (DOE Page G-4)

Fig. G-1 Darst Bottoms replacement well field diagram.

• Suggestions: No changes. A good, readable diagram.

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Page 125 (DOE Page G-5)

Figure G-2. Replacement Well Field Installation Schedule

A-284 • Suggestions: The permitting process would take far longer than 90 days because litigation would certainly be undertaken when the radiation data and danger to the public health is made known to the permitting agencies. Even if no lawsuits were filed, the entire schedule seems unrealistically accelerated. I would double the total time to 400 days and increase the phases proportionally. The project would take about two years.

Response A-284: Comment noted.

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Page 126 (DOE Page G-6)

Figure G-3. Typical Replacement Well Schematic.

A-285 • Suggestions: In addition to showing the elevation, the length and depth below ground level of the pump casing should be shown on the diagram.

Response A-285: DOE will indicate a typical depth for wells in the Missouri River alluvium on the figure.

[end of current document]

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awk/steward2

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